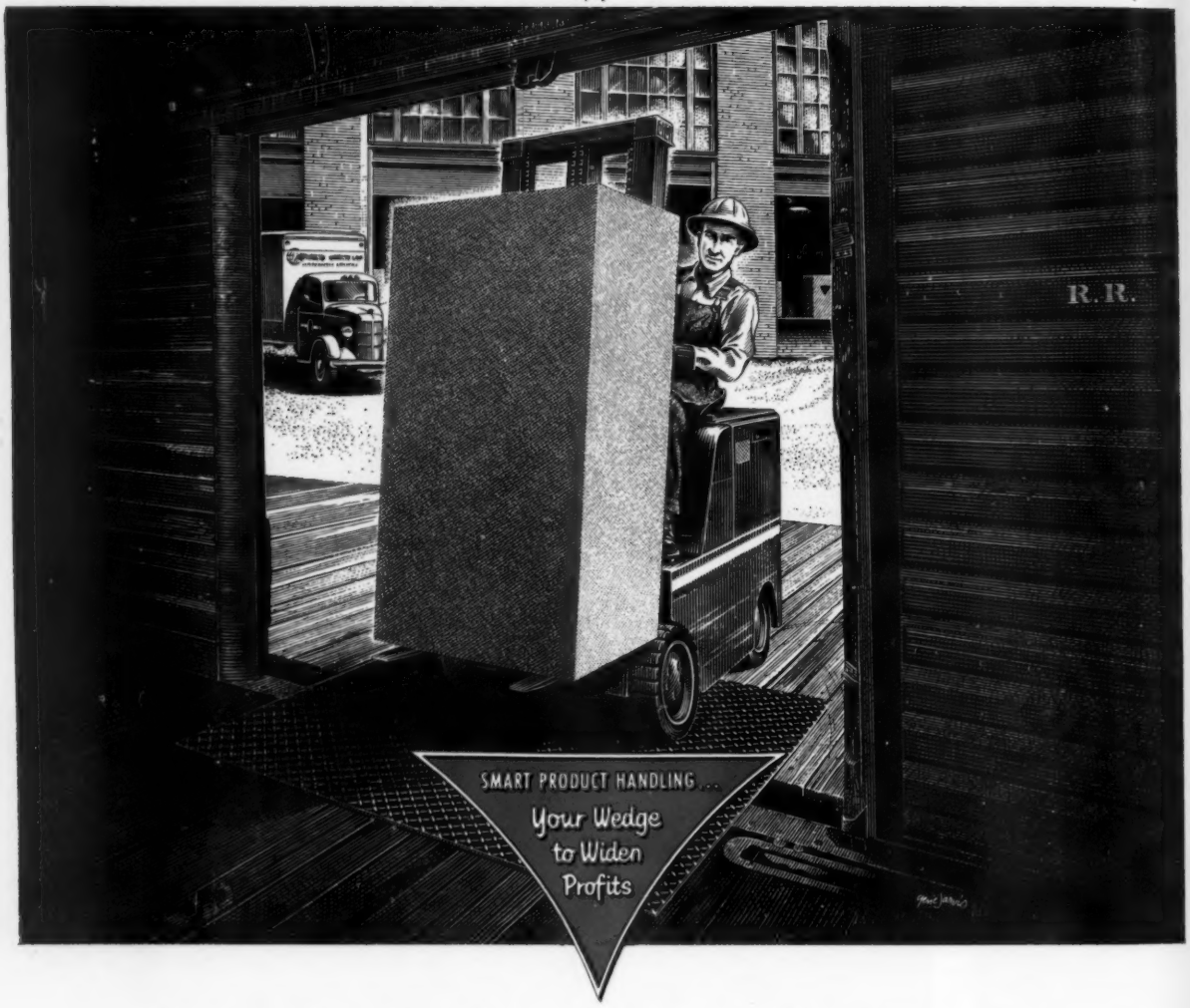

sate transit



An Expensive Packing Problem Has Disappeared Inside This Gaylord Box

Over-all packing costs were too high. Loading and unloading of freight cars involved too much manual labor. Gaylord solved both these problems with a special box entirely new to the industry.*

Such new Gaylord ideas in corrugated and solid fibre containers may help make your packing and product handling methods as up-to-date as the rest of your plant.

From a ton load of bulk material to tiny tropical fish, the list of products shipped in boxes engineered by Gaylord's Research and Development Division grows larger every day.

For information on the newest developments in your field, call your nearby Gaylord office.

Case history on request

GAYLORD CONTAINER CORPORATION

SALES OFFICES

Gaylord Boxes

General Offices: SAINT LOUIS, MO.

COAST-TO-COAST

CORRUGATED AND SOLID FIBRE BOXES • FOLDING CARTONS • KRAFT BAGS AND SACKS • KRAFT PAPER AND SPECIALTIES

ST-2

FEBRUARY • 1954 finish

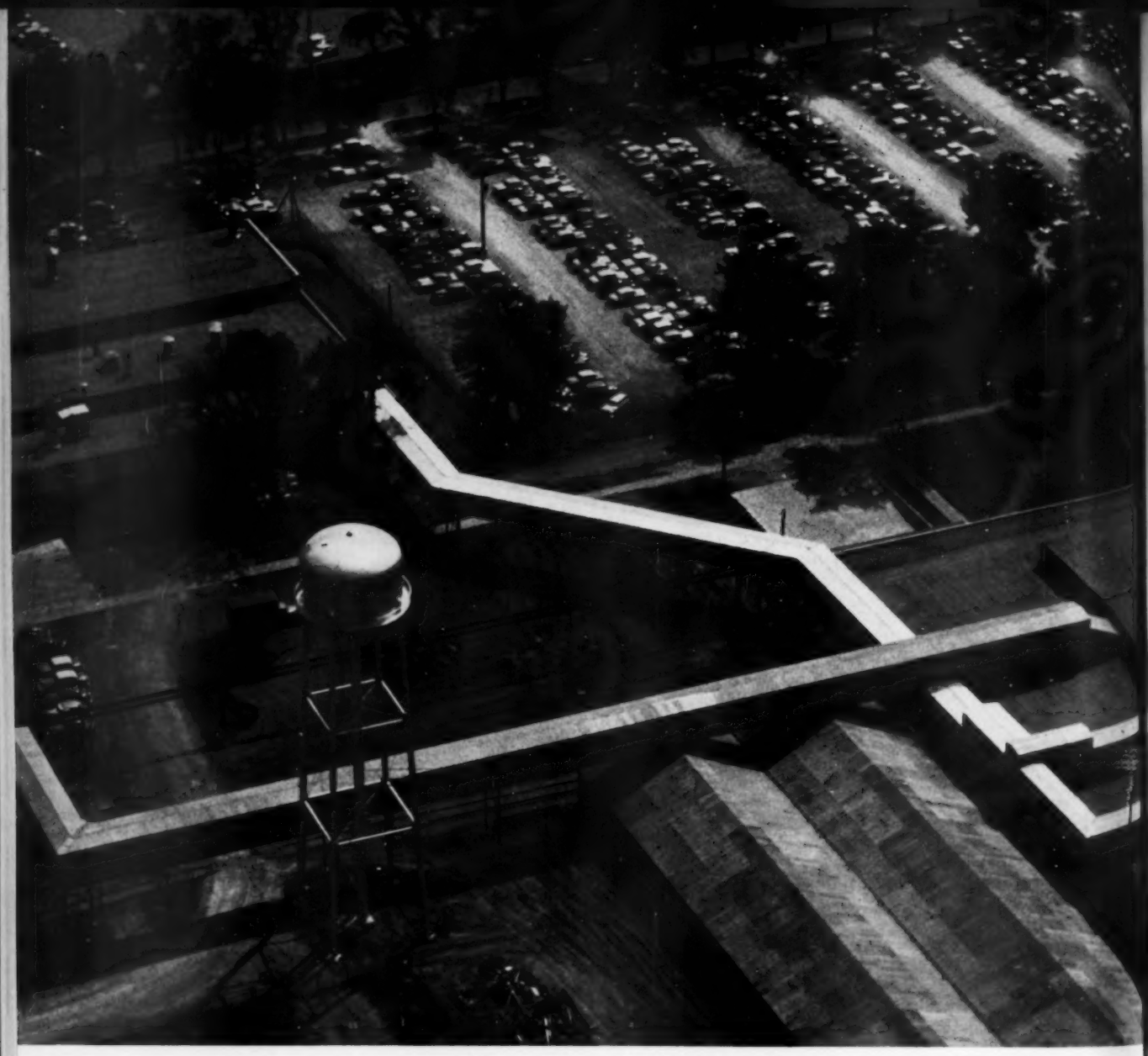
safe transit

A monthly trade publication section devoted to improved packaging and shipping and materials handling practices in the home appliance and metal products manufacturing field.

Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

CONTENTS



Interplant conveyor system links range plant with shipping warehouse and porcelain department.

Materials handling in Admiral's new range plant

(a photo brief)

THIS photo spread illustrates only a few of the many modern materials handling practices employed at Admiral's Midwest Manufacturing Corp., in Galesburg, Illinois.

Their range-refrigerator-freezer plants are practically 100% conveyorized, containing approximately six miles of conveyors of all types.

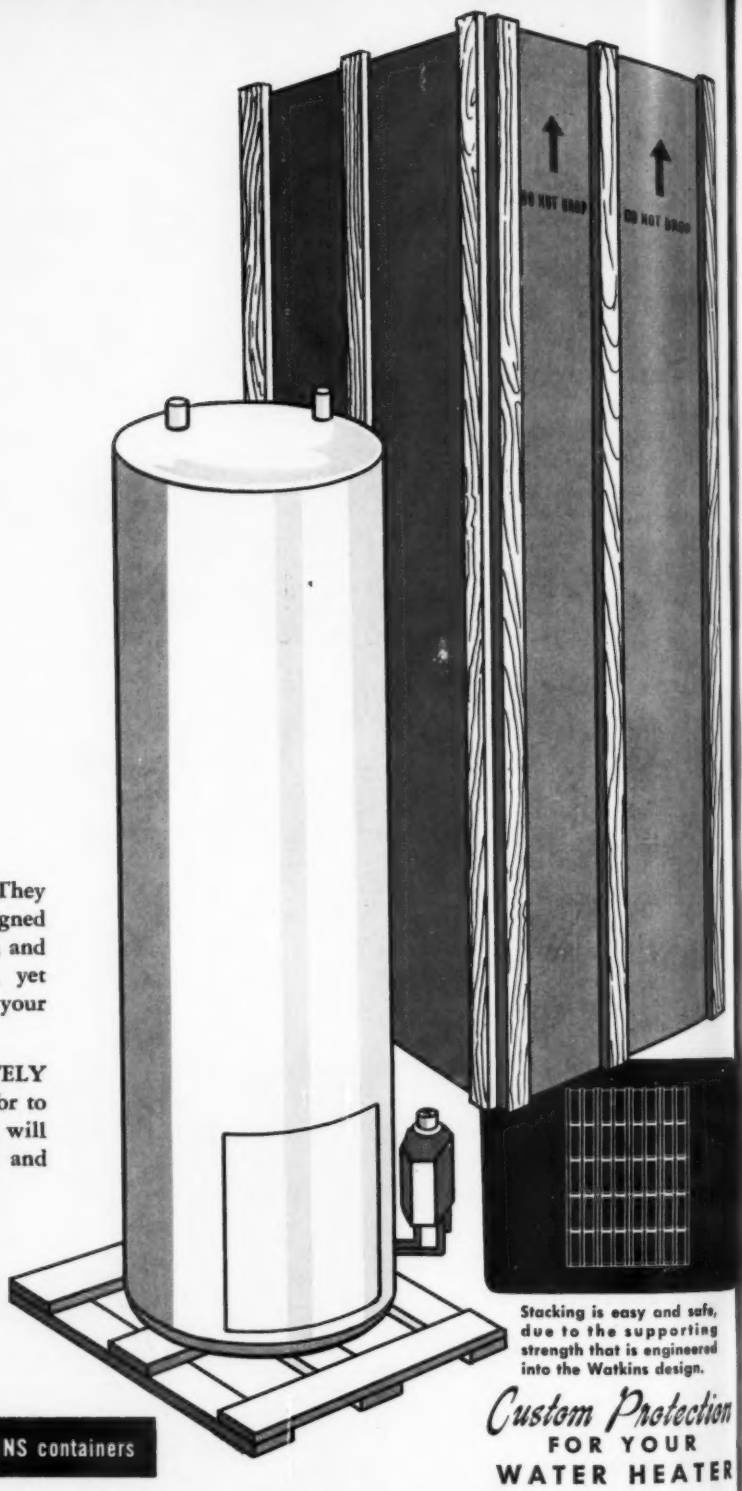
The covered interplant conveyor system, shown in the photo above, totals over 2000 feet in length. The covered two-way conveyor in foreground carries finished ranges from range plant (far right) to warehouse. The other conveyor transports range parts from porcelain department (upper left) to the range plant.

Materials handling is important in all production phases. In the first step in manufacturing Admiral ranges, an overhead crane is used to carry a five-ton bundle of sheet steel from the storage area to the fabrication department.

Photo on right shows a crated range being placed in a special unit rack on an overhead conveyor system for delivery to the warehouse.

Fork-lift trucks are used to stack crated ranges in the warehouse prior to loading them aboard freight cars for delivery to distributors. Admiral ranges carry the Safe Transit Label which tells the distributors that the crated ranges have passed National Safe Transit tests, and should reach their destination safely with normal handling.

WATKINS has the container for your shipping problem



Stacking is easy and safe, due to the supporting strength that is engineered into the Watkins design.

Watkins Containers will cut your shipping costs. They are delivered to your factory 75% assembled and designed for quick and easy completion, to save you labor, time, and expense. Scientific design gives maximum strength, yet keeps container weight at a minimum and reduces your shipping costs.

In a Watkins Container your product is COMPLETELY protected enclosed 100% by a smooth, staple-free interior to safeguard fine finishes and to keep out dust and dirt. It will carry safely, you can stack to any practical height, and resistance to "weaving" and shock is assured.

Only Watkins Containers provide all of these many desirable and necessary features and at no greater cost than other types of containers. Ship your carefully manufactured products safely and economically—ship them the "Watkins Way."

Custom Protection FOR YOUR WATER HEATER

these companies build WATKINS containers

Cornell Paperboard Products Co. ..... 1514 E. Thomas Ave., Milwaukee, Wis.
Cozier Container Corp. ..... 446 East 131st Street, Cleveland, Ohio
Crate-Rite Mfg. Corp., Division of Pacific Ports Ind. Inc. ..... 10901 Russett Street, Oakland, California
Dura-Crates, Inc. ..... 940 East Michigan Street, Indianapolis, Indiana
General Box Co. ..... 1825 Miner St., Des Plaines, Illinois, and 16th and Maple Sts., Louisville, Kentucky
Homb & Martin Mfg. Co. ..... Watseka, Illinois
Illinois Box & Crate Co. ..... 811 Center Street, Plainfield, Illinois
Kieckhefer Box & Lumber Co. ..... 1715 West Canal Street, Milwaukee,
Lane Container Corp. ..... 10212 Denton Road, Dallas,
Lewisburg Container Co. ..... 243 Singer Street, Lewisburg,
Livingston Wood Manufacturing, Ltd. ..... Tillsonburg, Ontario,
Love Mfg., Inc. ..... 608 South Commerce Street, Wichita,
Pennsylvania Box & Lumber Co. ..... 2331 N. Bodine St., Philadelphia
Utility Crate Corporation ..... 1985 E. 16th Street, Los Angeles 21,

—an inquiry to any of these companies will get prompt attention

The · WATKINS CONTAINER · Manufacturers

Joint industry conference on cushioning in packing

INDUSTRIAL and commercial packaging experts met recently at Wayne University, in Detroit, for a two-day Joint Industry Conference on "Cushioning in Packing." The conference was sponsored jointly by the school's Materials Management Center and the preservation-packing committee of General Motors Corp.

More than 250 industrial and commercial packaging experts attended the conference, which featured 24 technical papers.

Great interest was shown in the sessions which demonstrated that cushioning means and methods can be engineered by analytical methods, and their effectiveness proven by various testing methods. Many of those in attendance agreed that more on-the-job education is needed in the field of package cushioning.

Arrangements for the conference were made by a committee including L. A. Danse, engineering staff, General Motors; Dr. Spencer A. Larsen, director, Materials Management Center; Clinton K. Royce, Clint Royce Associates; Eltravis Van Wagnen, coordinator of military preservation and packing, General Motors Overseas Operations; Ralph O'Reilly, chairman, service parts packing, General Motors Corp.; Dr. Elias Klein, U.S. Naval Research Laboratory; George Demorest, ass't to director, Materials Management Center; and Harry Diefendorf, consultant, Materials Management Center.

Effects of vibration and shock — and the Safe Transit program

Ralph F. Bisbee, manager of quality control, Westinghouse Electric Corp., Mansfield, Ohio, told the conference that while the first intensive research work on the effects of vibration and shock dates back about 50 years, the *first national standard* on vibration and shock pre-shipping tests — recognized by both carriers and a group of manufacturers on a voluntary basis — only dates back to 1948. That is the year that the National Safe Transit Committee, of which Bisbee is general chairman, was set up to combat shipping and handling losses on appliances and allied products.

Bisbee pointed out that a summary of correlation research, conducted by the NST Committee in cooperation with the various types of carriers, shows that the "worst shocks under all conditions observed in the majority of cases occurred during handling." He pointed out that if manufacturers tested their finished products in accordance with the preshipment testing procedures recom-

Session chairman for the conference: left to right — George Demorest, ass't to director, Materials Management Center; Eltravis Van Wagnen, coordinator of military preservation, General Motors Overseas Operations; Dr. Elias Klein, U.S. Naval Research Lab.; and Clinton K. Royce, Clint Royce Associates.

The committee which arranged the conference: left to right — Harry Diefendorf, Materials Management Center; Eltravis Van Wagnen, General Motors; Dr. Elias Klein, U.S. Naval Research Lab.; Dr. Spencer A. Larsen, Materials Management Center; L. A. Danse, General Motors; Clinton K. Royce, Clint Royce Associates; and George Demorest, Materials Management Center. Absent from the group is Ralph O'Reilly, General Motors.

mended by the NST Committee, they would be assured that their packaged products would reach their destination safely under normal handling conditions.

Uses for cushioning materials

Gordon S. Mustin, of Container Laboratories, Inc., pointed out a number of purposes of cushioning, namely: (a) protection against abrasion and marring, (b) protection of small projections on a finished product, (c) an absorbent material to soak up spillage of liquids from containers, (d) filling of voids to make a solid pack, and (e) protection against shock and vibration.

The fundamental function of a cushion where localized shocks are concerned is absorption of the kinetic energy of the striking object, together with spreading the ensuing loads over a sufficient area of the packaged product so that damage will not occur. In "velocity shock", however, the cushion functions as an absorber of the kinetic energy of the product itself so that product will not be damaged, stated the speaker.

Mustin urged that pre-shipment testing of packaged products must be aggressively "sold" if advantage is to be taken of the sound testing techniques available today. He concluded that the package designer's real problem is securing adequate information concerning the equipment and materials with which he works.

Selecting the proper cushion

R. E. Jones, of Forest Products Laboratory, U. S. Dept. of Agriculture, said that the choice of a cushion should be influenced by several factors. For a given application, many types of cushioning materials may be eliminated due to physical and chemical characteristics, such as dust, acidity, and mold and bacteria resistance. Others may be eliminated because of economic factors, such as re-usability, availability, and the basis for shipping charges.

He pointed out that two factors to consider in the choice of cushions (relative to their energy absorption and peak acceleration) are the point of design on the stress-strain curve, and the thickness of cushion required.

Use of impact recorders by appliance, TV manufacturers

Willard S. Mielziner, of Impact-O-Graph Corp., discussed the use of self-contained and self-powered impact recorders so that "the efficiency of a container of known size can be pretested without the usual costly trial and error procedure."

As an example of the application of an impact recorder, Mielziner told about a refrigerator manufacturer who decided to start in his own plant to get the story of the handling of his product. A recorder was fastened to the tray of a refrigerator as it came off the assembly line and removed at the shipping dock. This procedure was repeated some fifty times. Analysis of the recordings showed that on the average, a shock occurred 3½ minutes after the refrigerator left the assembly line. Visual observation then showed that improper handling was the cause of the shock. Correction of this procedure stopped 20% of the damage claims for this company.

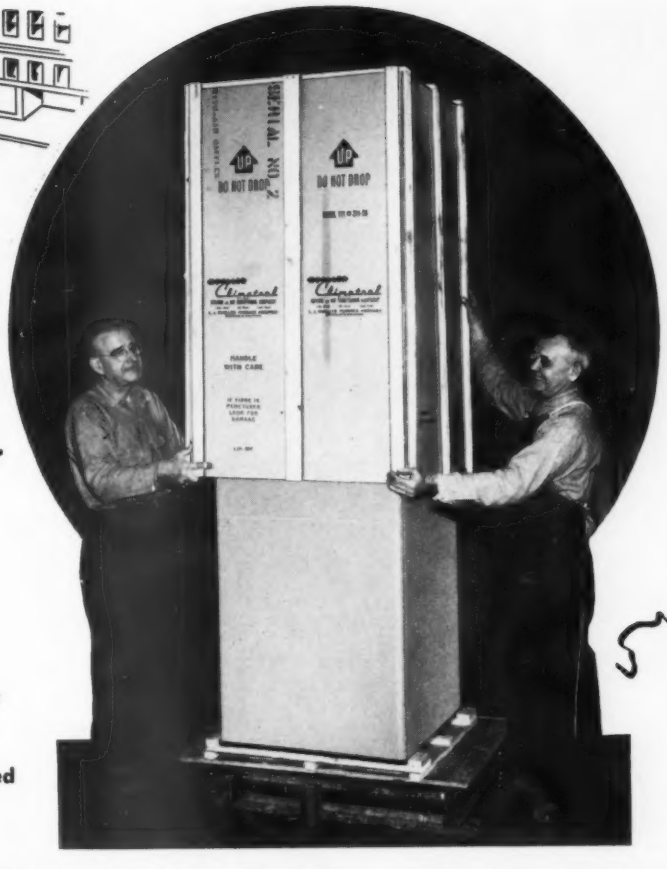
In another case, a manufacturer of radio and television sets advertised that they pre-tested their product and containers by shipping an impact recorder inside a dummy set which was then shipped to many different sections of the country. This procedure served to give that manufacturer a picture of what type of handling they could expect. Results were then duplicated in a laboratory and a proper package developed for the television sets.

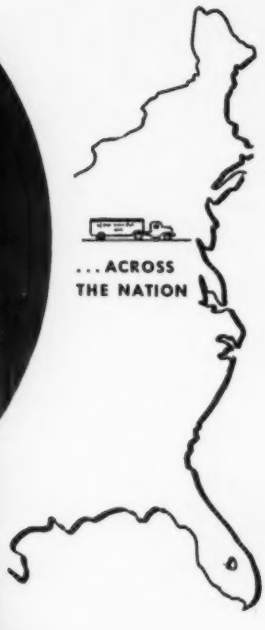
Pre-formed inner pack for appliance protection

Arthur W. Gaulke, of Vanant Company, Inc., discussed a new preformed inner pack which some refrigerator and range manufacturers are using to successfully pack porcelain ware, shelving, and other components.

The material is available in continuous strip form manufactured from solid fiber liner board, and consists of evenly spaced triangular peaks. Slots cut in each peak conform to the particular shape of the product and grip it firmly, while offering sufficient cushioning so as not to present a solid resistance to shock. Gaulke stated that "The fact that the material grips the perimeter of an item makes possible a minimum of shock transmission from the face of the shipping container." The material is usually applied with the aid of a cutting tool and hand stapler.

CONTAINERS FOR
AROUND THE CORNER
DELIVERY OR..





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Wooden Boxes
Box Shooks
Crates
Pallets
Kieckhefer *Paletboxes*
Industrial Lumber
Special Design Cleated Fibre Containers

DELIVER SAFELY
without a scratch...

...USE KIECKHEFER MILWAUKEE

The finest finished products can reach your customers exactly as they leave your plant —if both your product and your *container* are properly engineered to do the job.

Kieckhefer-Milwaukee offers you 50 years of practical experience in engineering and building the right container for the right product.

For many applications in the appliance and finished product field, we highly recommend the Kieckhefer-built Watkins type container — it's strong, it's light, it's easy to handle, and it keeps your product clean.

For other applications, from neon signs to industrial machinery, we will recommend the *type* of box or crate best suited to *your* needs.

Kieckhefer-Milwaukee products will deliver your products safely — economically — around the corner or across the nation.

And when you are a Kieckhefer customer, you can depend on the same kind of service and prompt delivery that built a reputation for meeting *all* delivery promise dates.

Kieckhefer-Milwaukee Containers will meet your Government Specifications

PACKAGING ENGINEERS KIECKHEFER MILWAUKEE FOR FIFTY YEARS

KIECKHEFER BOX AND LUMBER CO.

• WOODEN BOXES • BOX SHOOKS • CRATES • CLEATED FIBRE SHIPPING CONTAINERS •

1715 WEST CANAL STREET, MILWAUKEE 3, WIS.

TOUR HOTPOINT PLANTS

Members of the Chicago Chapter of the Society of Industrial Packaging and Materials Handling Engineers were conducted on a tour of Hotpoint Company's electric range and refrigerator plants, on January 12, by Hotpoint materials handling personnel. James Kirk, of Kimberly-Clark Corp., is the chapter's tours chairman.

AAR PROMOTES HARMON TO FURNITURE SPECIALIST

The Freight Loss and Damage Prevention Section of the Association of American Railroads has announced the promotion of R. E. L. Harmon as furniture specialist with headquarters in Chicago. He succeeds F. C. Dansereau, who resigned to accept another position.

FREIGHT LOSS AND DAMAGE PREVENTION FORUM

The Michigan Freight Claim Association recently presented a four-state area conference, in Detroit, on freight loss and damage prevention.

One of the interesting portions of the conference was a panel discussion on packing, marking, and checking. The panel included shipping and carrier representatives.

During the discussion, W. F. Keefe, packaging engineer, Westinghouse Electric Corp., Mansfield, Ohio, presented a resumé of the National Safe Transit Program from its inception up to the present.

CERTIFICATION FOR LENNOX, FRANKLIN TRANSFORMER, AND AVCO DIVISION

The National Safe Transit Committee has announced that certifications under the NST Program now total 144.

Latest certifications include The Lennox Furnace Company, Marshalltown, Iowa; Franklin Transformer Mfg. Co., Inc., Minneapolis, Minnesota; and the Appliance and Electronics Division of Avco Manufacturing Corp., Cincinnati, Ohio.

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

and eliminates Crating Department bottleneck for Hotpoint!

"BEFORE" HOTPOINT RANGE PRODUCTION LINE STALLED. Hotpoint workers found the hand stretcher method (shown above) too awkward in fastening corrugated board for shipping protection to new ranges as they poured off the production line. The line kept backing up.

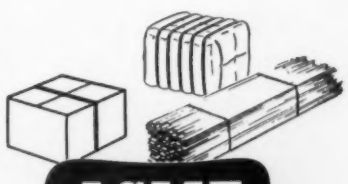
"NOW" ACME STEEL PNEUMATIC STRETCHER ELIMINATES BOTTLENECK, CUTS COSTS! The same workers now tension pre-cut Acme Steel strapping with an Acme Steel pneumatic stretcher. Shipping preparation costs have been held as much as 20 per cent below normal industry shipping costs. One operator says, "A man couldn't last all day before—too hard on the arms. Now with the Acme Steel system it's easy to keep ahead of production."

There it is. A clear cut case of how Acme Steel and know-how in steel strapping has helped a leading manufacturer solve a critical problem.

Chances are that many of your own production assembly or packing and loading problems can be cleared up with Acme Steel strapping, the best way to protect your product in shipment.

You will also learn that Acme Steel strapping, and the Acme Steel tools that work with it, will save materials and pay for themselves in a short time. Employees are happier because they know increased production means more, steadier jobs.

There are dozens of cases in the files to prove that nearly everything made to eat, wear, sit on or live in can be assembled and packed swiftly and will arrive safely with Acme Steel strapping. For specific examples, write to Acme Steel Products Division, Dept. F-24.



ACME STEEL

ACME STEEL COMPANY

2807 ARCHER AVENUE, CHICAGO 8, ILL.

PURDUE INAUGURATES PACKAGING INSTITUTE

An "Institute for Packaging Personnel", consisting of 4-week sessions, has been inaugurated by the Division of Adult Education, Purdue University, Lafayette, Ind.

Mart I. Fowler, associate professor of air transportation, is coordinator of the program.

The objects of Purdue's new program is three-fold: (1) Provide information, technical knowledge, and background to those working in government, transportation and industry having common problems in the field of packaging; (2) Establish a source of supply for information in the field of packaging generally; and (3) Focus and exploit the broad areas of knowledge of the University, such as engineering mechanics, chemistry, physics, and mechanical engineering, upon the general field of packaging.

Two days during each course are devoted to a field trip to inspect testing laboratories in the Chicago area. Institute students will thus have an opportunity to see research projects in operation.

COMMEMORATIVE BOOKLET ON STRAPPING INDUSTRY

How the growth of the steel industry parallels 40 years of growth of one manufacturer in the industry is graphically presented in a commemorative booklet released by Signode Steel Strapping Co.

The history of protective packaging and shipping is told, with the story continuing with events leading up to the introduction of tensioning and sealing tools.

HINDE & DAUCH TO BUILD NEW PLANT IN KANSAS CITY

Hinde & Dauch Paper Co. has announced acquisition of a 17-acre site in Kansas City, Kansas, for construction of a factory to make corrugated and solid fibre shipping boxes.

Charles E. Frohman, uresident, said that the new factory has been made necessary by the ever-expanding needs of industry. Hinde & Dauch has been operating a factory in Kansas City since 1926.

GERRARD PROMOTES REED

Harry M. Reed has been named vice president-sales, to succeed W. B. Renois, resigned, it was announced by Harry G. Walter, president of Gerrard Steel Strapping Division of United States Steel Corp. Reed had been central district and product service manager.

ACME STEEL NAMES CAMP, JORGENSEN TO NEW POSTS

Percy L. Dafoe, vice president and sales manager, Acme Steel Products Division, Acme Steel Co., Chicago, has announced the appointments of Roy C. Camp as southeastern district sales manager and Dan C. Jorgensen as special sales representative for the southern area. Camp replaces Robert Lammers who was transferred to the firm's general offices in Chicago as sales manager of Steelstrap.

MATERIAL HANDLING INDUSTRY VOLUME REACHES $1.25 BILLION

Howard M. Palmer, president of The Material Handling Institute, Inc., has announced that the volume of the industry "has reached $1,250,000,000 worth of material handling equipment — conveyors, pallets, steel strapping, hoists, cranes, monorail systems, skids, tote boxes, elevators, wheeled floor trucks, electric and gasoline-powered industrial trucks — which has reduced the costs of and made possible the more efficient production of 108 billion dollars worth of manufactured goods plus the warehousing and distribution of these goods — about one dollar of material handling equipment for each 100 dollars of manufactured products."

Continuing, Palmer stated that "Top management is changing its attitude toward material handling because it now realizes the increased production and lowered costs that can be obtained by overall integration . . . More and more, now we find the material handling function being exercised by a vice president with a voice in top management decisions with full power and responsibilty to integrate material handling with accounting, purchasing, warehousing, plant layout, tool design and maintenance."

SIPMHE MOVES OFFICES TO NEW QUARTERS

C. J. Carney, Jr., managing director, Society of Industrial Packaging and Materials Handling Engineers, has announced that SIPMHE's new national headquarters office are now located in the Austin Building at 111 West Jackson Blvd., Chicago 4, Ill.

NATIONAL PACKAGING SHOW IN ATLANTIC CITY, APRIL 5-8

The 23rd National Packaging Exposition to be held in Atlantic City, April 5-8, will be the largest in the history of the event, according to a spokesman for the American Management Association.

It is expected that a record-breaking 400 exhibitors will display the latest in packaging equipment, materials, and services. Attendance also is expected to set a new record.

SET DATE FOR INDUSTRIAL PACKAGING, HANDLING SHOW

The Society of Industrial Packaging and Materials Handling Engineers has announced that its Exposition and Short Course will be held in Chicago, September 28-30.

CANADIAN TECHNICAL GROUP TO HOLD PACKAGING FORUM

The first National Forum of the Technical Institute of Packaging Association of Canada will be held at the King Edward Hotel, Toronto, February 25, according to T. M. Dutton, Institute general chairman.

Objective of the forum is to explain the newest trends in packaging research and to promote better packaging techniques in the various consumer and packaging trade groups.

Emphasis will be placed on the technical developments rather than on sales. For this reason, the program has been specifically designed to appeal to the technically-minded group in the packaging field, such as plant superintendents, production foremen, laboratory technicians and other technical personnel.

Admiral TAKES EXTRA PRECAUTIONS

CRATING OF NEW *Admiral* RANGES FOR SHIPPING THROUGHOUT THE UNITED STATES

Yes, Admiral takes extra precautions in crating and meets Safe Transit standards to eliminate possible damage to its products while in transit.

Admiral and many other leading appliance manufacturers depend upon Chicago Mill and Lumber Company to assist them in eliminating possible damage to their products while in transit. These companies know that they can depend upon Chicago Mill to work closely with their own crating engineers to develop the best possible crate design, for the "know how" resulting from 72 years experience and tests in a Safe Transit Laboratory. They know that Chicago Mill can produce the box or crate with the right combination of materials for the stacking, handling and safe shipping of the product.

Why not contact Chicago Mill and let us show you what we can do to improve the crating and protection of your product.

Wirebound,
Nailed or Hinge Corner
Cleated Plywood
Cleated Craveneer
Cleated Corrugated
Watkins Type Containers
Shop and Tote Boxes
Woodsteel Nesting Boxes

★

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A shipping container for every shipping purpose

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"I saw your ad in finish"

Winter market . . .

→ *from Page 79*

tion to the basic functions of cooling air, filtering it and removing moisture.

The new *Amana* year-round model can furnish six different combinations of cooling, heating and ventilation—each of which may be selected by adjusting a horizontal glider control to the correct position. All the necessary switching of dampers, compressor and fans then is accomplished automatically.

Admiral's air conditioners have 18 different dial settings to provide 18 kinds of weather. Some models are dual-purpose units that also can heat any room with the adjustment of one control.

A "dual intelligence system" is featured on the *Crosley* air conditioner which can be turned on automatically only when wanted—and then only if the room is hot enough to need it. It also will heat the room if it's too chilly. A clock-like timing arrangement, that can be pre-set for seven days, turns the conditioner on and off at scheduled times.

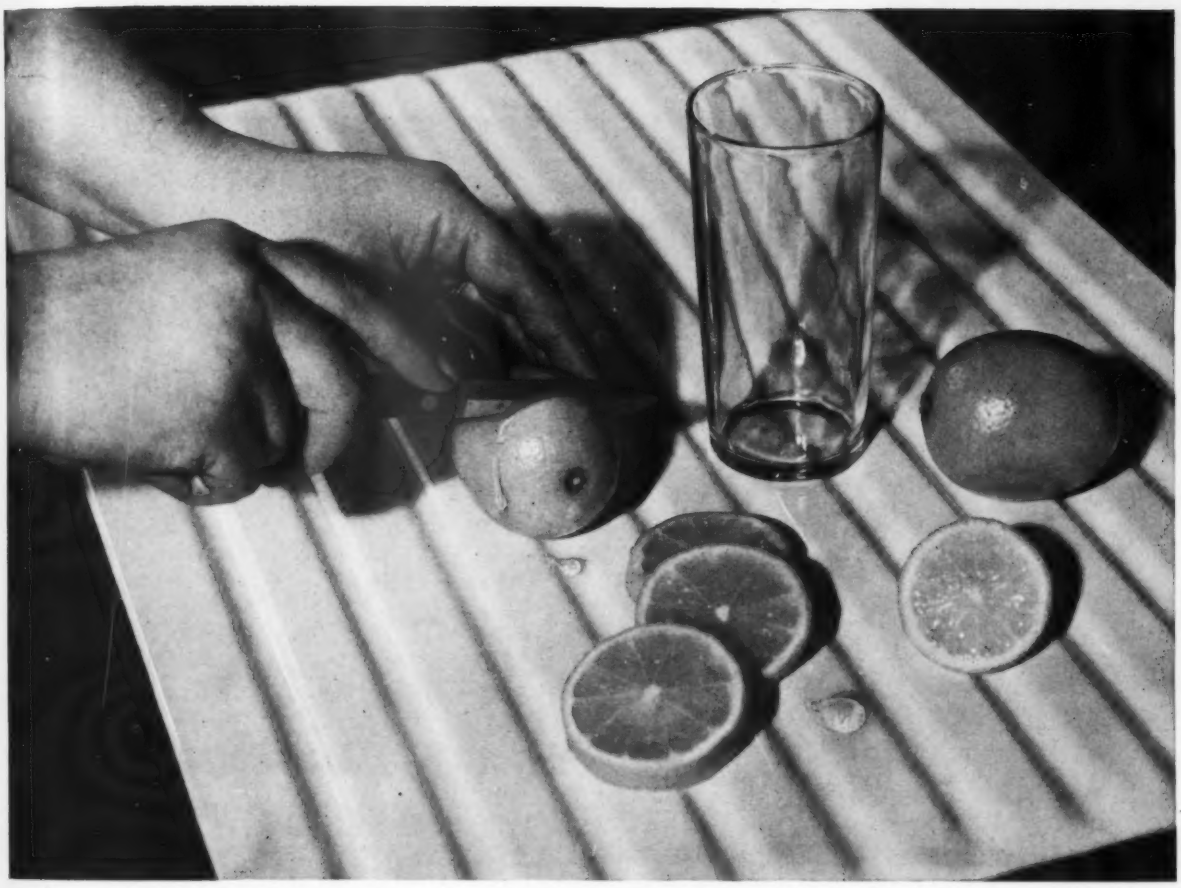
Operating model of wall-mounted "cabinet" refrigerator-freezer

The nation's first operating model of a wall-mounted, cabinet-like refrigerator-freezer, employing a new type of thin-wall vacuum insulation, was displayed by *General Electric*. Horizontal in design and planned for installation at a convenient height above a counter-top work surface, the experimental model is mounted on a wall much as a cabinet would be.

Hotpoint opens new showroom

One of the most modern appliance showrooms in the Chicago area, utilizing advanced design and display techniques such as sliding glass panels, raised brick floors and column and island displays, was formally opened by *Hotpoint* at The Merchandise Mart.

Just inside the showroom is a raised brick floor. It is designed to display and set-off Hotpoint's new Customline electric range units. The oven unit is set right into the brick wall which adorns the front display.



The finish that acids don't stain helps sales

When buyers hold back and it's tough to make sales, you can get a real edge on competition by putting extra sales effort behind products that have acid-resisting porcelain enamel finishes.

This durable finish is not damaged by fruit juices, alcohol or commonly used chemicals which tend to permanently mark or destroy many other kinds of finishes.

A porcelain enameled finish gives your products many other advantages too. It is called the "lifetime finish" because it is made of hard, rock-like minerals that are not affected by time or rust. After years of service it looks just as good as the day it was fused to the base metal.

WITHSTANDS HEAT

Porcelain enamel is easy to clean and keep clean. Soap and water will usually remove all traces of stain and dirt. Even hot irons or forgotten cigarettes won't damage porcelain enamel. Its hard glossy surface withstands any temperature it is likely to encounter in home service.

You can finish your products with porcelain enamel in any color, in any variations of shades, and in textured or plain surfaces. And you can be sure the color won't "fade out."

Of course, the metal beneath the Porcelain Enamel surface must have excellent bonding qualities, flatness, and uniform fabricating characteristics. That is why more manufacturers have used more Armco Enameling Iron over a longer period than any other enameling base. That is why too it has become known as the "World's Standard Enameling Iron."

ARMCO STEEL CORPORATION

4363 Curtis Street, Middletown, Ohio

Export: The Armco International Corporation

ARMCO

FASTEST THING IN FASTENINGS®

TINNERMAN
Speed Nut
SAVINGS STORIES

"EASY does it" with SPEED NUTS®

...cuts assembly time 87%!

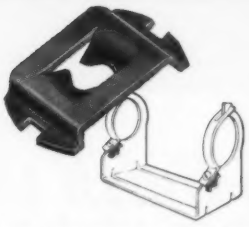
Easy Spindrier

What was causing delays in the production of the new Easy Spindrier? Easy engineers recently found out in a hurry. It was the motor mount bracket assembly. A staking operation was creating a decided bottleneck.

Borrowing on their own long-time experience with SPEED NUT brand fasteners—and the help of the Tinnerman field engineer—they hit on a highly successful solution using a special Flat-Type SPEED NUT!

Proof of the success was supplied through a startling 87% saving in production time—and an overall cost savings of 47%!

Little wonder, then, that Easy engineers saw to it that over 60 SPEED NUTS were designed into the new Easy Automatic Washers.



Special self-retaining Flat-Type SPEED NUT snaps easily into existing notch in bracket. Replaces round nut which was staked down, often causing distortion of nut—this meant re-tapping. Also, paint clogged around nut, causing screws to bind. Paint can't clog SPEED NUTS.

Send today for your copy of SPEED NUT "Savings Stories"; write: TINNERMAN PRODUCTS, INC., Department 12, Box 6688, Cleveland 1, Ohio. *In Canada:* Dominion Fasteners Limited, Hamilton, Ontario. *In Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *In France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois (Seine).

TINNERMAN Speed Nuts®

MORE THAN 8000 SHAPES AND SIZES

March • 1954

VOL. 11 • NO. 3

FEATURES

MISCELLANEOUS

finish

MONTHLY TRADE PUBLICATION
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A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. Includes technical and practical information on plant facilities and manufacturing problems from raw metal to safe delivery of the finished product, with special emphasis on fabrication, metal preparation, metal finishing, assembly, and packaging and shipping.

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BPA NBP

finish

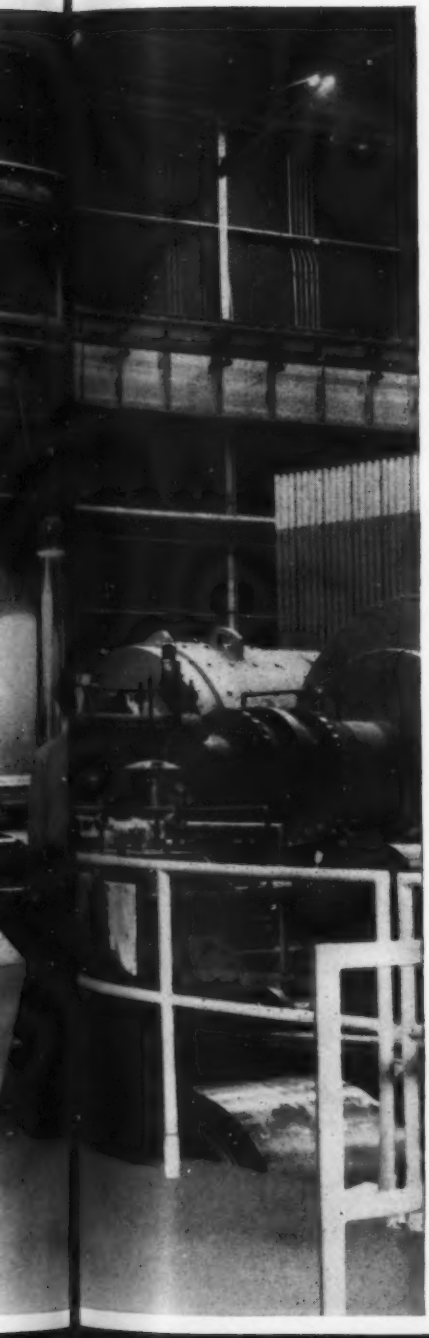
METAL PRODUCTS MANUFACTURING
FROM RAW METAL TO FINISHED PRODUCT

Youngstown now offers cold-reduce

THE YOUNGSTOWN SHEET AND TUBE COMPA

Manufacturers of Carbon, Alloy and Yoloy Steel

ducets and strip from its Indiana Harbor Works



THIS new continuous cold-reduced sheet mill at East Chicago, with a monthly capacity of 40,000 tons, is now in production and increasing output daily. Orders for sheets and strip, up to 50" wide, are now being booked.

Completion of this mill is the latest step in a series of major additions and improvements at our Indiana Harbor Works since the war, representing an investment of many millions of dollars.

Backed by a completely modernized steel plant, the new mill is ready to serve your needs, no matter how large or small. Write or phone our nearest District Sales Office for further information.

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MEETINGS

ELECTRIC SIGN ASSN.

National Electric Sign Association, annual meeting, Conrad Hilton Hotel, Chicago, February 28 to March 3.

ENAMELERS CLUB MEETINGS

Eastern Enamelers Club, Hotel Sylvania, Philadelphia, March 6.

Midwest Enamelers Club, LaSalle Hotel, Chicago, March 20.

INDUSTRIAL FINISHES COURSE

Case Institute of Technology, annnual short course on industrial finishes, Cleveland, Ohio, March 10-12.

PRESSED METAL INSTITUTE SPRING TECHNICAL MEETING

Pressed Metal Institute, annual spring technical meeting, Hotel Carter, Cleveland, March 17-19.

LUBRICATION ENGINEERS

American Society of Lubrication Engineers, annual meeting and exhibit, Cincinnati, April 5-7.

EDISON ELECTRIC INSTITUTE

Edison Electric Institute, annual sales conference, Edgewater Beach Hotel, Chicago, April 5-8.

CERAMIC SOCIETY MEETING

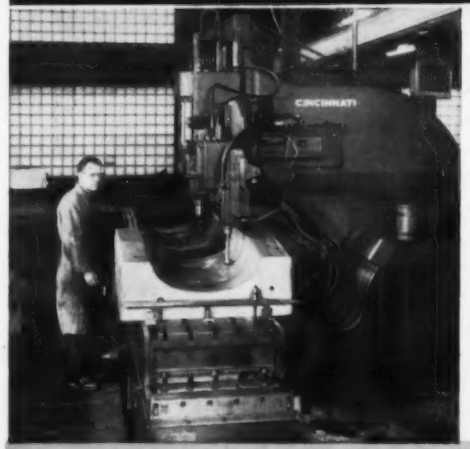
American Ceramic Society, annual meeting, Palmer House, Chicago, April 19-23.

TOOL ENGINEERS EXPOSITION

American Society of Tool Engineers, industrial exposition, Philadelphia's Convention Center, April 26-30.

WELDING EXPOSITION

American Welding Society, spring technical meeting and welding and allied industry exposition, Memorial Auditorium, Buffalo, May 4-7.



ABOVE: Typical tooling job is the Cam Flange Die shown above. This is an adjustable die to cam flange both sides of three different sizes of range tops with one stroke of the press for each top.

LEFT: Showing work done on a typical job—using a 28" x 96" Cincinnati Vertical Hydro-Tel, with automatic tracer and depth control.

Designers and Builders of Dies, Tools, Jigs, Fixtures and Special Machines

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● A good prescription for your "tough", troublesome stamping problems . . . is EFFICIENT TOOLING. You can eliminate production headaches—simplify your stamping operations—reduce production costs—with ingenious well-constructed dies and tools by EFFICIENT.

Our organization has the know-how, the experience, the engineering skill to tool your most complicated parts to your best advantage.

Our large modern plant has complete machine facilities to meet your requirements. Our up-to-the-minute equipment includes tryout presses up to 300 tons capacity. Sample parts are delivered for your approval before dies are shipped to you.

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PERMA-VIEW'S crystal clear glass and gleaming chrome lend eye-appeal and salable beauty to your range. There are over 1,000,000 PERMA-VIEW sealed oven door windows in use today. This is *proof positive* of their excellent performance and acceptability.

The PERMA-VIEW window is pre-engineered and comes to you ready for immediate installation in your range — "out of our carton — into your door."

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Pictured herein are typical customer parts . . . utilizing *varied* Amos processes and skills to achieve *simple*, appealing beauty or *complex* decorative effects. All of these parts were molded of transparent materials with many of the multi-finishing operations on the *reverse* side to avoid scratching and marring in use.

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CHARLES M. WHITE
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Republic Steel Corporation

"I'm proud to be a Savings Bonds salesman for Uncle Sam and I urge every business executive in the nation to advance the cause of American enterprise in this way.

"Every one of us at Republic Steel is proud of the results of our Payroll Savings campaign: 96.7 per cent of our employees saving systematically from each pay in U. S. Savings Bonds. These results were possible only because all 68,344 of us at Republic were part of an enthusiastic team. We feel that this is the best way we can demonstrate our appreciation of the efforts to have a sound dollar and a stable economy."

• 96.7% of Republic Steel's 68,344 employees — over 66,000 men and women — are enrolled in the Payroll Savings Plan.

• These 66,000 members of Republic's "enthusiastic team," as Mr. White so aptly terms them, are investing more than $16,000,000 per year in U. S. Savings Bonds.

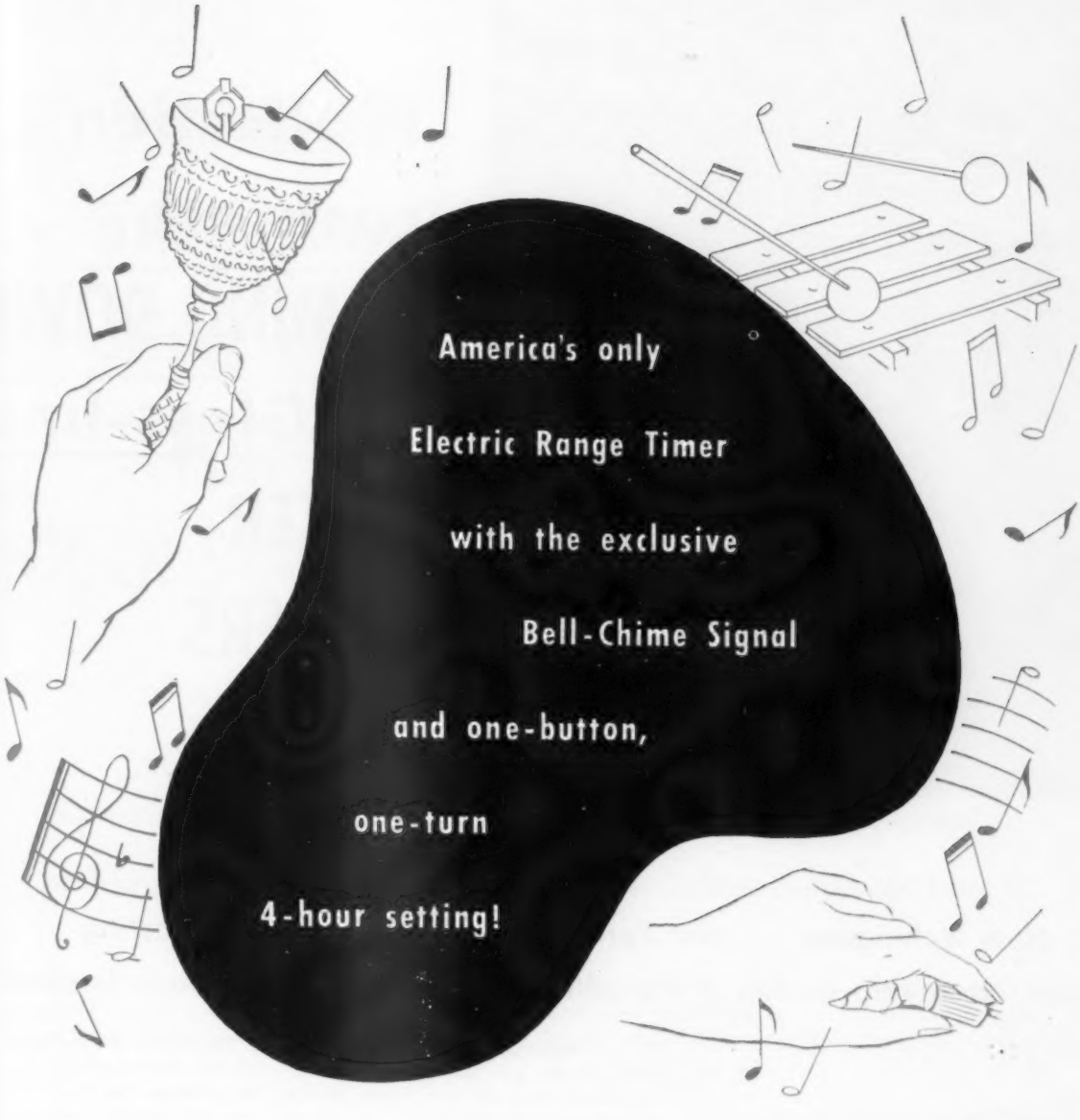
• In addition to building personal security, these men and women of Republic are making a very important contribution to America's "efforts to have a sound dollar and a stable economy."

Certainly Republic Steel's Payroll Savings record is outstanding — one of the best in the country. But it is not unique. Other companies have comparable records, measured in percentage of employee participation, or in annual Savings Bond purchases.

In every company with a high percentage Payroll Savings Plan you will find that the president or top executive appreciates the importance of the Plan and what it means to personal and national security. He knows that 45,000 companies have Payroll Savings Plans . . . that 8,000,000 employees of these companies are investing more than $160,000,000 per month in Savings Bonds . . . that the cash value of Savings Bonds held by individuals today is more than 36 billion dollars — and rapidly mounting, thanks largely to the steadily increasing family of Payroll Savers. He is 100% behind his company's Payroll Savings Plan, and everybody in the company knows it. He takes personal pride in watching employee participation grow to 60%, 70%, 80%, or, perhaps, the high 90's.

If you are not making this important contribution to America's effort for a sound dollar and a stable economy, a wire or letter to Savings Bonds Division, U. S. Treasury Department, Washington, D. C., will bring prompt cooperation from your State Director. He will show you how easy it is to join Mr. White and thousands of other executives as a Savings Bond Salesman for Uncle Sam, with a company Payroll Savings Plan that you can be proud of.

The United States Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the Advertising Council and this Magazine.



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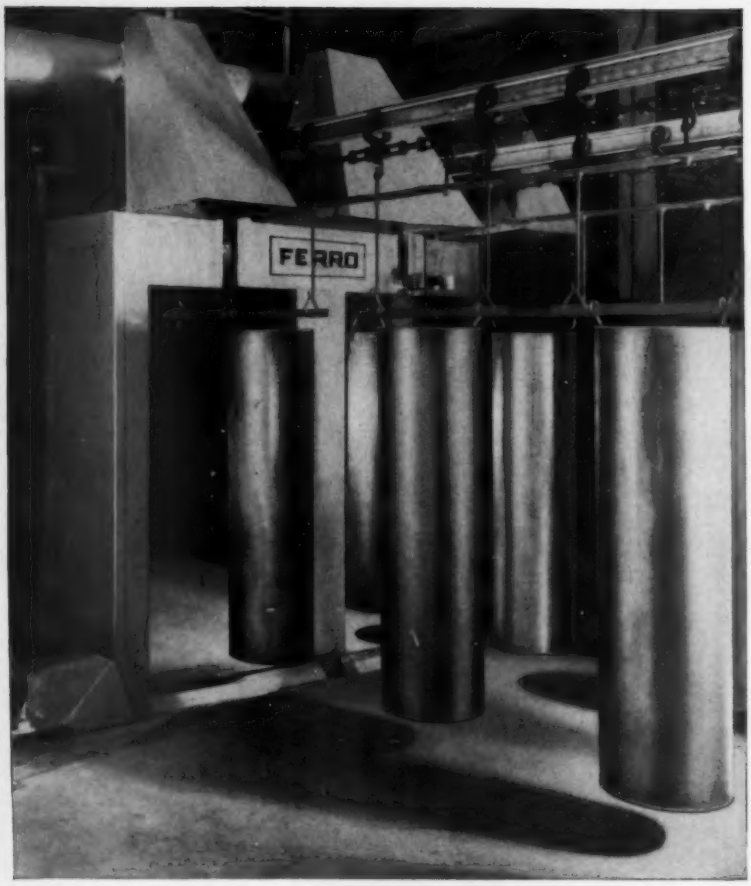
LUX Time
YOUR TIME-REMINDER LINE

THE LUX CLOCK MANUFACTURING COMPANY • WATERBURY 20, CONNECTICUT



Production costs are COMING DOWN on Glass-lined WATER HEATERS

New techniques . . . plus Ferro's new "2505" . . . are boosting output, improving quality of Porcelain-enameled tanks for water heaters

In the porcelain-enameling of hot water tanks, it's the *net* production you get that determines your costs. And rigid quality standards must be maintained. Hence, the problem has been one of *improving quality* while refining the process to get more uniform—and more *uniformly good*—results.

Working hand in hand with some of our customers, we have developed a new frit especially formulated for hot water tanks. It's Ferro's "2505" which not only "goes on" easier and has excellent adherence qualities, but performs better in use. Laboratory tests show it superior in acid and alkali resistance. Field tests in actual service also show most satisfactory results.

Ferro's new "2505" is a single-coat, one-fire finish, ideal for high-production plants. Suppose we drop in and tell you about it, also show you samples from the finished ware. Just say when, and we'll be there!

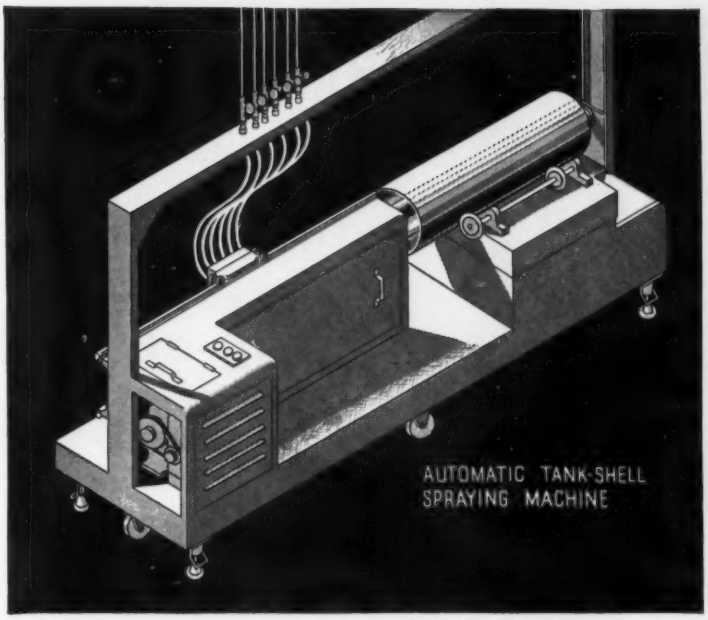
FERRO

FERRO CORPORATION

Porcelain Enamel Division

4150 East 56th Street • Cleveland 5, Ohio

FERRO ALSO PIONEERS "fully automatic" enameling plant FOR STILL BIGGER SAVINGS



Continuous-flow installation pickles, roto-blasts, spray-coats and fires . . . produces up to 100 water heater tanks an hour

Water heater tanks, once the most difficult of products to porcelain-enamel, will undoubtedly be the first to utilize the new principles of "automation". Basic reasons for this are (1) uniformity of product in size and shape, (2) long uninterrupted runs of each size.

Ferro engineers have now perfected such a porcelain-enameling system. The fabricated tanks are put on a conveyer line just ahead of the pickling vats, then carried through the entire process which operates automatically. Transfer to each conveyer line is also handled with automatic equipment.

Roto-blasting is used for the cleaning of metal to accelerate this phase of the operation. *Automatic spray-coating* assures not only complete coverage of the metal, but also uniform thickness of the protective finish.

The cost advantages of such a system are obvious and will be fully proved out in a matter of months. Ferro engineers are also studying the application of many of the principles used here to other porcelain-enameling production lines. If this appeals to *you,* can we talk about it sometime?

FERRO CORPORATION

Engineering Division

4150 East 56th Street • Cleveland 5, Ohio

FERRO

You can end production headaches, increase manufacturing profits, and sell quality-built products, by using G. P. & F.'s complete fabricating and finishing service. Scores of America's leading firms use and recommend our service for hundreds of highly diversified items—including everything from parts for automobiles to home appliances—or from coin-operated dispensers to office equipment.

WE FINISH AND ASSEMBLE - - - We can handle your *complete* job—from start to finish. We specialize in medium and large sized seamless drawn metal stampings—but our service also includes forming, welding, galvanizing, polishing, vitreous enameling, spray painting, and complete assembling.

ALL UNDER ONE ROOF - - - - - Not only do we relieve you of production details and responsibilities, but we also increase your profits by reducing shipping time and transportation costs on your contracted parts. All work is done under one roof in our centrally located Milwaukee plant. And, if you wish, we can package your products, and ship directly to your customers!

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THE finish spotlight

All-season room air conditioners, made by Cory's Fresh'nd-Aire Division, feature "Electromagnetic" push-button controls, flush mounting, and highly stylized design. The new models cool, dehumidify, circulate, filter, ventilate, exhaust, and heat the air.

thin skins make the toughest hides

TITANOX titanium dioxide puts porcelain into the *film* category. This compound, when properly formulated into porcelain enamel, hides steel appliance surfaces so well that thick coatings are not required.

Modern titania porcelain enamel is unsurpassed as the tough beauty finish for modern sinks, stoves, appliance cabinets and wherever water, heat, household acids and alkalies appear. TITANOX titanium dioxides that do this job best are TITANOX-TG and TITANOX-TG-400 for they are designed specifically for porcelain enamels.

Consult with our Technical Service Department for the solution to any problems you may have concerning the formulation of modern porcelain finishes. Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; Atlanta 2; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

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the brightest name in the finish

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TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

PORCELAIN ENAMEL

a proved engineering material that adds EXTRA VALUES to your products!

Extra CORROSION RESISTANCE

Being 100% inorganic and non-porous, Porcelain Enamel provides unexcelled resistance to the attacks of moisture, steam, organic solvents, most acids, cold alkalies and other corrosive materials.

Extra WEAR RESISTANCE

Porcelain Enamel is glass-hard and steel-strong, consequently products finished with this material render exceptional service in applications requiring resistance to scratching or abrasion. Typical products in which this property is especially valuable are: ranges, washers, dryers, work surfaces, refrigerators, tables and smaller appliances.

Extra BEAUTY

Porcelain Enamel offers an almost unlimited range of beautiful colors, and a wide choice of distinctive surface textures. The permanent, non-fading, non-staining beauty of Porcelain Enamel appeals to buyers of a wide variety of products for the home.

Extra HEAT RESISTANCE

Porcelain Enamel does not burn, and can be made in grades that withstand temperatures up to 1700°F. and higher.

Extra EMISSIVITY

Emissivity—the heat emitting value—of Porcelain Enamel is higher than that of almost any other material. This can be an important advantage for many products.

Extra STRENGTH

Porcelain Enamel gains its strength and rigidity from the steel base. Because of this, Porcelain Enamel is ideal where a strong, lightweight, durable material is required.

Extra CLEANLINESS

For products used where strict sanitary conditions must be maintained, or where ease of cleaning is important, Porcelain Enamel is unsurpassed. Its hard, smooth non-porous surface does not harbor dirt, germs, or foreign matter and surface soil is readily removed.

Extra ECONOMY

Costly alloys or scarce materials can frequently be replaced by Porcelain Enamel to achieve worthwhile cost savings without sacrifice of quality or performance of the product. Fabrication of parts to be Porcelain Enameled is accomplished by familiar processes.

Lifetime PORCELAIN ENAMEL

PORCELAIN ENAMEL INSTITUTE, INC.

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interesting material each month

Gentlemen:

We read your fine magazine each month for the interesting material it contains.

Ernest Davis, Secretary
Kickhaefer Manufacturing Co.
Milwaukee, Wisconsin

Safe Transit editorial

Gentlemen:

Your "Finish Line" editorial in the February issue sets an all-time high for a brief but all embracing article about the National Safe Transit Program, its purpose, aims and end results.

L. A. Adams
Chicago Vitreous Enamel Product Co.
Cicero, Illinois

Western Union

Gentlemen:

Wonderful job (Special Whirlpool Section of January *finish)*. Special congratulations to John McLaughlin.

R. H. Stone
Ransburg Electro-Coating Corp.
Indianapolis, Indiana

A Letter to the Netherlands

N. V. Uzergieteruen En
Emailleerfabrieken
DE ETNA, Breda
Tramsingel 17, Netherlands

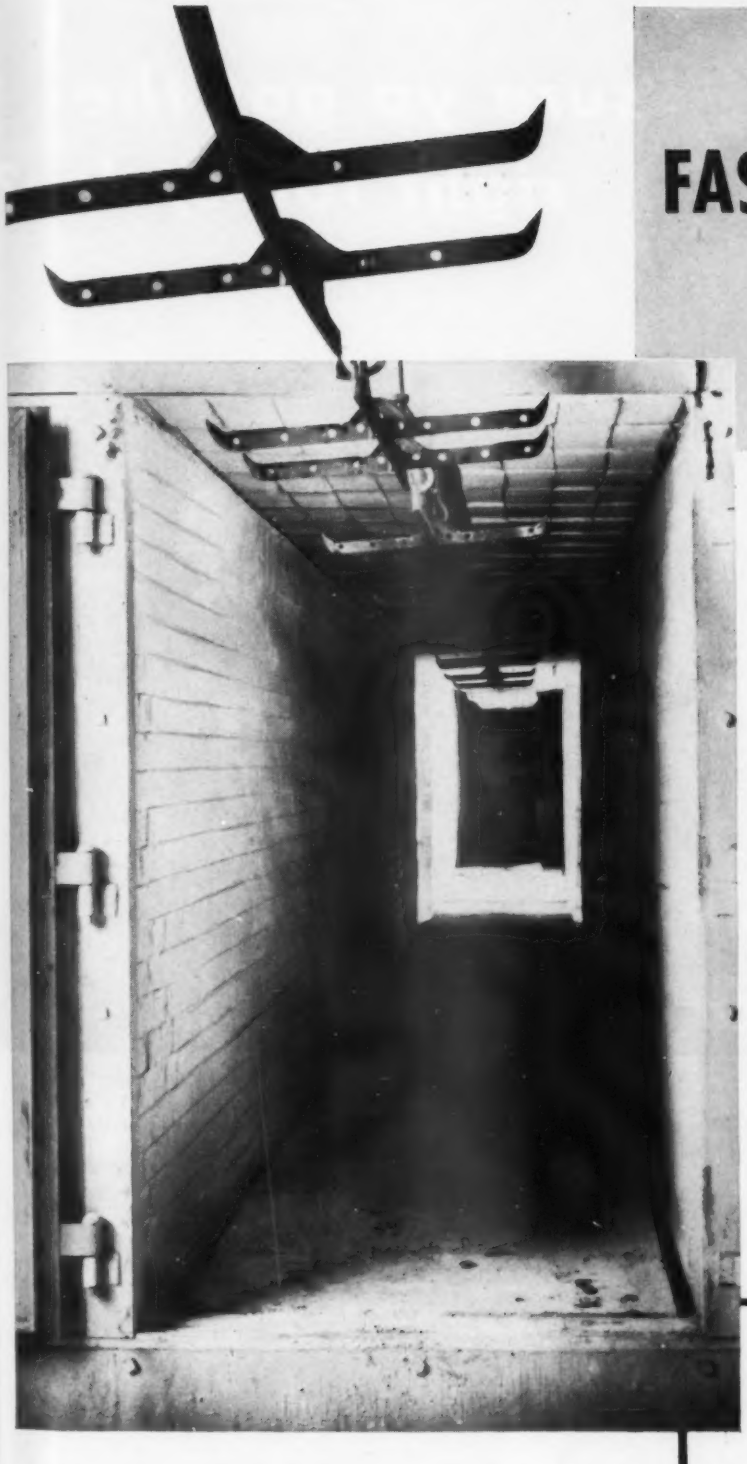
Gentlemen:

Received a request from Dana Chase in regards to your reference of my article in *finish* magazine.

Thank you kindly for the inquiry. It's very interesting to know that the *finish* magazine articles reach the distant shores and that our little efforts have some good end.

I have asked Fernholtz Machinery, the suppliers of this piece of equipment, to send you all data available.

Joseph A. Disario
Smoot-Holman Co.
Inglewood, California



FOR FAST, UNIFORM HEAT TRANSFER

It's a striking sight to look into a furnace equipped with a CARBOFRAX® silicon carbide muffle. The entire muffle area radiates heat uniformly with no temperature differential apparent.

It's also interesting to see a fast acting furnace like this shift from one operation to another. Here, for example, they switch from enameling stove parts at 1560 F to TV cones at 1620 F — and the changeover is almost instantaneous.

But what is most significant about this muffle is not that it is silicon carbide — or even that it is *our* silicon carbide — but that our engineers worked with the operator in *applying* these refractories.

Actually, *three different super refractories* are used in this furnace. Each has its place. Each does a particular job. And their *combined* properties make a furnace that gives optimum performance and service.

Frankly, if you use super refractories, we think it makes sense to enlist the experience of the World's largest manufacturer of these highly specialized materials. If you have any problems, we'll be pleased to make recommendations. We invite your inquiries.

The muffle in this furnace has CARBOFRAX® sidewalls, and an ALFRAX® aluminum oxide bottom. The support arches and pierfacing are made of MULLFRAX® electric furnace mullite.

CARBORUNDUM
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Dept. K-34, Refractories Div.
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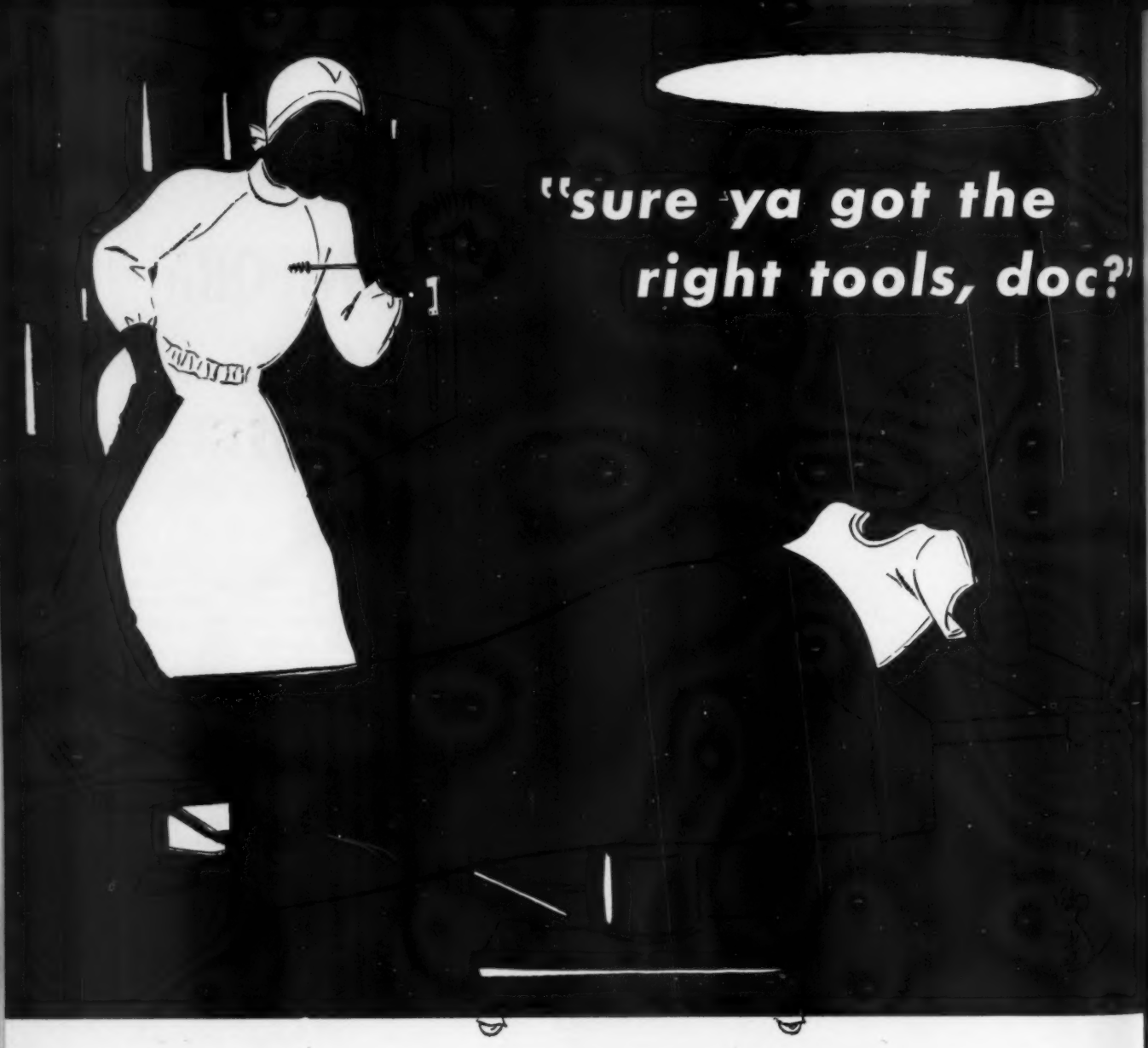

The right tools are important to the success of any job. In enameling it's essential to have the right frit whether it be for ranges, refrigerators, washers, driers, water heaters, bath tubs, sinks, signs or complete architectural installations.

Chicago Vit has developed a wide variety of frits for a wide variety of uses. And, each frit was made for a purpose . . . to do a certain job. When Chicago Vit recommends one frit or a combination of frits, the specific recommendation is based on your individual need. All the facts are carefully weighed—design of the part or product to be enameled, gauge and type of metal to be used, plant processing conditions, end use of the part or product and the particular service conditions to which it will be exposed.

So, when you receive a Chicago Vit recommendation, you can be sure that it is "right" for the job at hand.. No matter what the enameling question may be, Chicago Vit's 35 years of service to the industry will go to work at once to get you the answer you need.

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FOR FINEST FRIT • CHICAGO VIT..

finish SUGGESTION BOX

One-step method of "buttoning" metal sheets together

A new one-step method of literally "buttoning" metal sheets together has proved to be almost two-thirds faster than riveting in actual production runs by a San Francisco manufacturer.

This is the experience of Otis Sheet Metal, Inc., in the manufacture of metal bank cabinets. A regular punch press was converted to the metal fastening duty just by inserting special punches and dies in the press, stated Erik Skovgaard, president of Otis.

The new "metal lacing" method was found to be 60% faster than riveting in fastening 14 gauge steel hinges to 11 gauge steel doors of the cabinets. On other tasks, where welding formerly was used, the metal lacing method proved even faster, said Skovgaard.

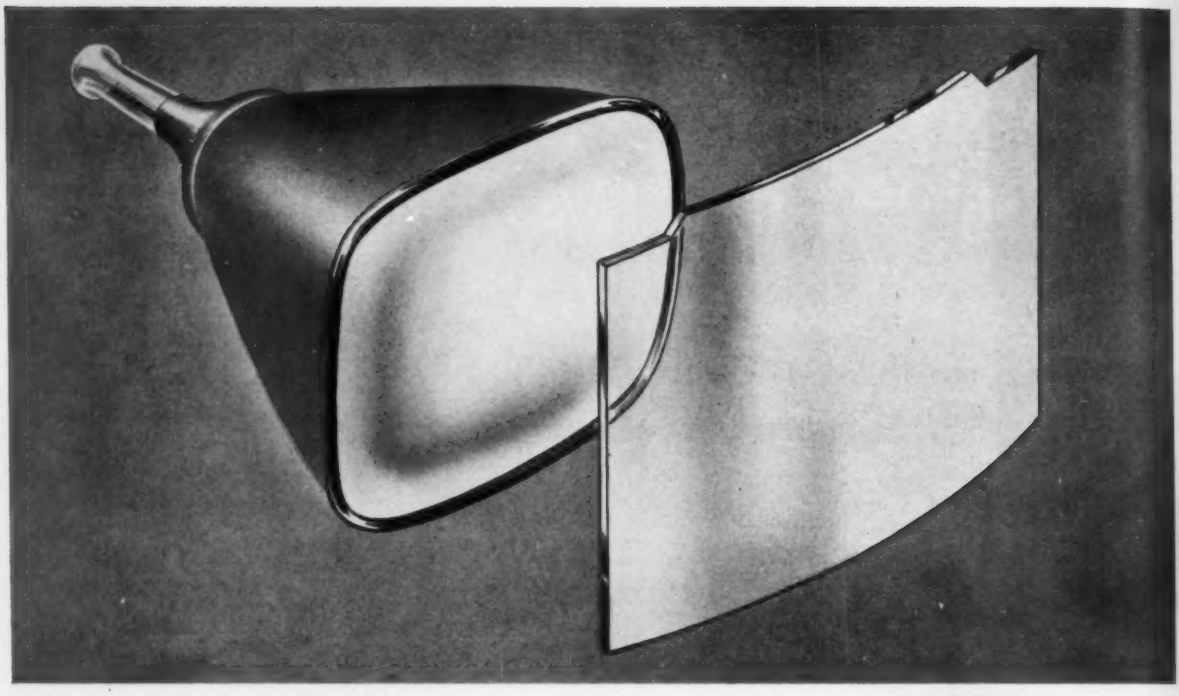
Formerly the hinges were riveted to the doors. This meant three separate operations: punching holes in the hinge plate; punching matching holes in the steel doors; and then inserting and flattening the rivets.

The one-step fastening action of the metal lacing method stems from three separate operations that occur during the impact of the punch on the metal and the die. First, shearing action of the punch creates a double parallel incision in the sheets of metal being fastened. Metal between these incisions is rammed downward against the anvil of the die beneath the sheets and between the die's movable jaws. There the impact spreads the depressed metal sideways to form a permanent fastening wedge or button under the surface of the bottom sheet. Strength of the fastening is said to be comparable to rivets.

Source for more information on this metal fastening method may be obtained by writing to *finish*.

Right: Erik Skovgaard, Otis Sheet Metal president, points where metal lacing is used in production of metal bank cabinets.

Below: Showing fastening 14 gauge steel hinge to 11 gauge door by use of special punch and die set in regular punch press.



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Glass — enhances the beauty and broadens the acceptance of your product whether in the utility appliance field or the growing electronic industry.

Glass — adapted with skill and precision by MARSCO to meet your product requirements — For Today — For Tomorrow.

Glass — flat as can be — precisely shaped to fit.

Glass — bent — convex — drilled — to the most exacting tolerance.

Glass — hardened, heat-treated or tempered to survive your consumer usage unscathed.

Join the major appliance manufacturers now enjoying extra sales from the appeal and prestige contributed thru the luster of glass — MARSCO'S Crystal Clear Glass.

Our engineers are experienced in incorporating glass as viewing windows in domestic appliances and television cabinets.
A simple request to us solves your problem.

Bent Glass

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MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.

Rheem installs new dryer line

a photo story of production operations for Rheem's newest product

Illustrated with finishfotos

by Gilbert C. Close • WESTERN EDITOR

finish

The old adage of technical men . . . . "Know-how is the smoothest road to quick success" . . . . was demonstrated recently at the huge Rheem Manufacturing Company plant, South Gate, California, where a production line for automatic clothes dryers was laid out, tooled, and put in operation in less time than is often spent in thinking about a new product.

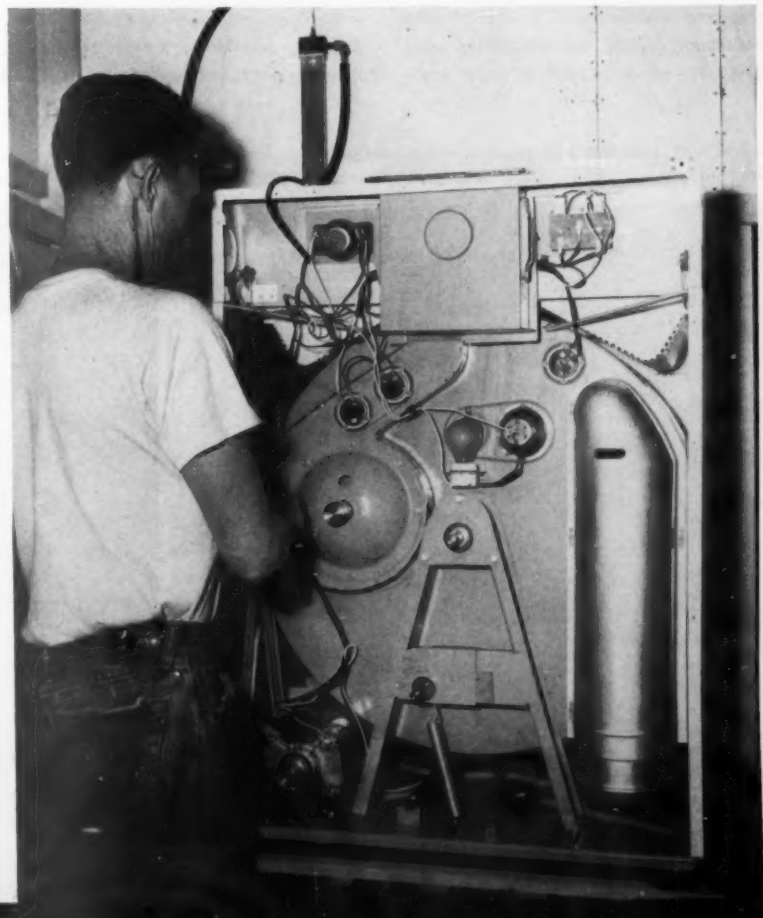
Rheem engineers had plenty of production line experience to draw from. The plant already boasted a production line for steel drums, one for water heaters, another for five-gallon industrial pails, and still another producing five-gallon "blitz" cans for the military. All of these production lines are as near automatic as is possible, requiring a minimum number of employees for maximum production. The advantageous features of all lines were incorporated in the new clothes dryer line.

The company claims several advantages for its new Wedgewood clothes dryer. It is pointed out that the new dryer maintains one of the fastest per hour evaporation rates of any similar machine now on the market. There is a special compartment for quick drying of delicate fabrics by warm air action only and without tumbling. A complete range of drying temperatures is available. The clothes tumbler is ball-bearing mounted, and of 20 lbs. capacity. Either gas or electric heated units are available. The machine may be vented in any direction—either up, down, backwards, or to either side—thus facilitating installation anywhere in the laundry. Other features include a low-heat "airacle" flow where air is pre-heated before it enters, a complete filtering system for incoming air, ozonizer, and a touch-latch door control.

The new clothes dryer assembly line is fed by the same fabrication and finishing departments that feed other Rheem production lines. Beyond this point, the new line is an entity in itself, specifically laid out to assemble, test and crate clothes dryers only. This singleness of purpose is characteristic of all Rheem production lines, and makes possible the use of many automatic features.

Some 300 press operations are required in fabricating the dryer parts. These range from simple blanking and bending through draw, compound, and progressive press operations. One of the biggest jobs in tooling the new line was the design

Inspection is made as conveyor carries dryer to crating department.



1. *Forming an angle bracket on lower front base member—one of more than 300 press operations used in producing the dryer.*

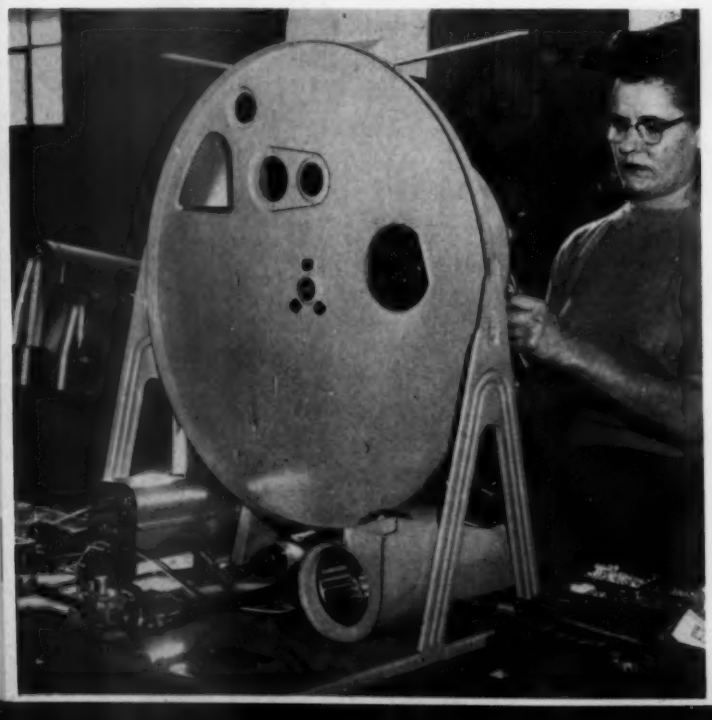
2. *Completing second "wiping" operation on dryer compo after sanding of prime coat, and prior to finish coat.* First ball

and development of the more than 300 draw press dies required. Beyond the draw press department, sub-assembly spot welding takes place.

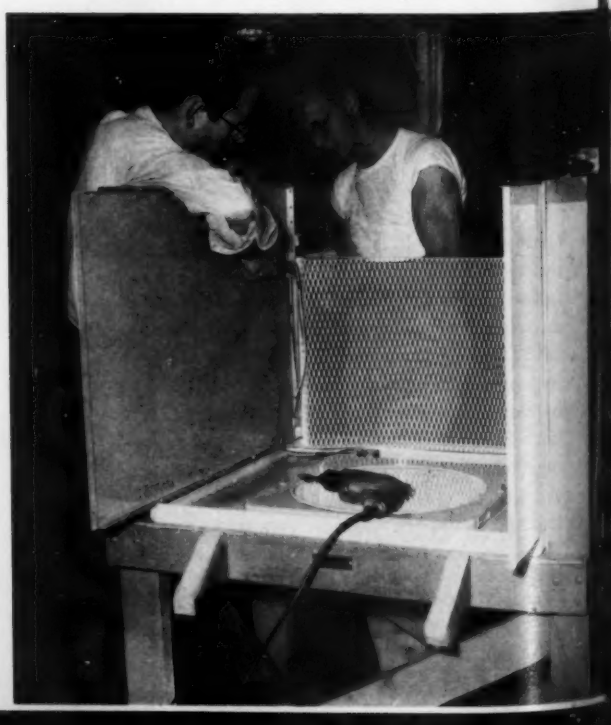
Following another practice, common to all their production lines, all dryer parts are pre-finished before assembly, thus eliminating any final finishing operations. Formed parts and spot-welded sub-assemblies are first processed through a fully automatic and conveyorized metal cleaning and surface treating installation to make them ready for painting. This installation consists of an 80-foot processing chamber including in progressive stages an alkaline cleaner, rinse, phosphatizing bath, rinse, chromic acid bath, and dryer. All solutions are maintained at 180° F., and the chemical solutions are titrated daily. It takes each part about 15 minutes to traverse this cleaning and pre-treatment cycle.

After the parts emerge from the cleaner, they are transferred to the paint booth conveyor. All clothes dryer parts receive a primer coating, while some parts which will not be finish coated are primed twice. Most interior parts are flow-coated. Each exterior part is completely sanded and given a double wiping operation

5. *This employee completes a component installation as the unit moves past her at about 18" a minute conveyor speed.*



6. *End of sub-assembly line of the cabinet component whi delivered to the final assembly line at this point.* Fina poi



First operation on final assembly line—installing precision ball bearings in which the clothes tumbler operates.

4. *Second operation on final assembly line—installing the base for the shipping carton, with use of automatic tools.*

after each prime coating. This double wiping operation insures removal of all sanding dust and other loose surface dirt that would impair the quality of the finish coating.

All exterior parts of the dryer are coated with a white baking enamel. All spraying, both prime and finish, is by hand in water-wash paint booths. The parts travel from the paint booths directly into a drying oven where primer coats are baked dry at 385° F. and white coats at 325° F. Baking time is 20 minutes for both finishes. A rigid inspection follows painting.

Final assembly is a continuous, straight-line operation. When the dryer leaves this line, it is inspected, crated and ready for shipment. This line is fed at intervals by sub-assembly lines, branching in to the final assembly line at points where the parts are needed. The entire assembly operation is so well balanced that accumulations of sub-assemblies along the final line are rare and limited.

First operation on the final assembly line is the installation and adjustment of the precision ball bearings in which the tumbler rotates.

to Page ST-12 →

Final operation on the tumbler sub-assembly line. At this point the tumblers are delivered to final assembly.

8. *Completed dryer receives a final inspection. Shipping base has been with unit since its start along the assembly line.*

DRUM TAKES BEATING EVERY WASHDAY

The finish on the drum of the new Caloric gas dryer must withstand extreme moisture, heat and severe abrasion action. To meet these attacks, and to solve problems in the finishing of their new unit, Caloric Stove Corporation, Topton, Pennsylvania, called on Glidden Technical Service.

Glidden met Caloric's specifications by recommending a white NU-PON for the exterior of the dryer, and a blue-gray NU-PON for the interior.

Glidden also assisted in the planning of the finishing department, and in the selecting of equipment.

Tests proved that NU-PON offered excellent abrasion resistance to tumbling clothes, plus superior corrosion and heat resistance. In addition, the flexibility of NU-PON reduced damage in shipment, speeded prodution and lowered rejects. All these advantages justified Caloric's investment in a new synthetic finishing department.

NU-PON Inside and Out—to enhance product styling . . . to provide longer product life.

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Product design should pay its own way

"beauty should be more than skin deep" says this appliance designer; case histories used to illustrate the practical results of design research

by Howard Bourner • CHIEF ENGINEER, DESIGN, TEMCO, INC., NASHVILLE, TENNESSEE; MEMBER OF SOCIETY OF INDUSTRIAL DESIGNERS

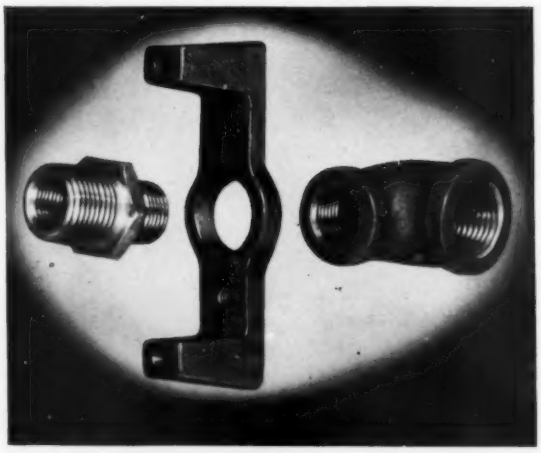
Exclusive feature finish

Industrial design has come of age and in so doing has given rise to a healthy condition whereby the designer is no longer considered a "pretty picture boy", but is an accepted member of the product development team. The designer, like the management which he serves, is more interested in placing the product of his creative efforts in some consumer's home rather than preserving it within the cloistered walls of a musty art museum.

The complexity of modern mass production calls for the combined efforts of a group of specialists, each contributing his skills and knowledge. Always keeping in mind that the finished product must have eye appeal as well as functional correctness, the various members of our engineering department follow the product from rough sketch idea-stage through production tooling. Thus the end product is the result of this composite engineering effort which creates design to sell.

Design can mean many things

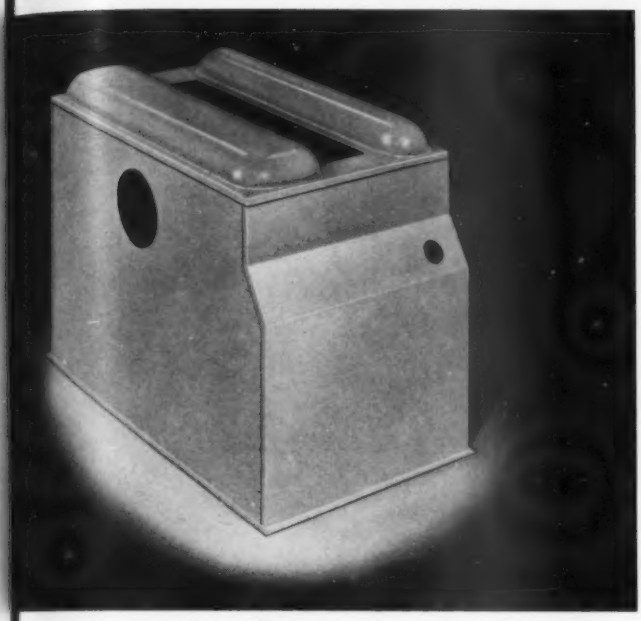
Design can mean a wide variety of things to a manufacturer such as Temco. It may demonstrate its intrinsic value in some small part which the average consumer never sees, or it may prove its worth in the overall



A

B

C



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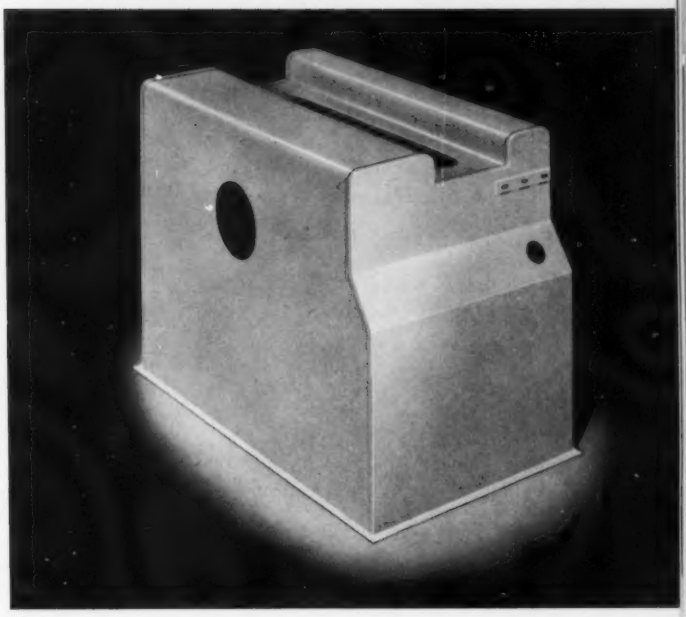

E

continuity of a product whose intricacies stagger the imagination of the man who enjoys the pride of ownership. Wherever it is found, there must be a logical reason for its use. Beauty must be more than skin deep; it should penetrate to the very core and then bubble up to the surface in a homogeneity which spells sales to its producer. A man of keen insight said "You never get volume without price and you never get price without volume." By the same token, neither price nor volume can be realized without the proper use of design which pays its own way.

Practical applications

The competent industrialist is well aware that there can be no hocus pocus involved in the service which the industrial designer renders. This article therefore attempts to briefly illustrate the practical application of design in several projects which have recently been considered by our engineering department.

ORIFICE FITTING BRACKET

A typical case history of design for lower cost has to do with the re-design of an orifice fitting bracket, a device which is employed on all Temco vented gas space heaters and floor furnaces and serves the purpose of properly locating the main burner orifice at the injection tube throat. Its secondary function is to provide a means of adjustment for the air shutter control. Originally this assembly consisted of three parts as shown in **Photograph A.** A cast iron bridge was secured to a standard ½" x ⅜" street elbow by means of a threaded brass screw machine part. The complete assembly, to say the least, was an "ugly duckling" and cost $0.45 per unit.

Our first efforts were seriously hampered by existing restrictions that prevented the use of aluminum die casting alloys. This automatically limited our design thinking to the gray iron casting shown in **Photograph B.** It was not difficult to improve the appearance of this part and in doing so the finished piece price per unit was reduced from $0.45 to $0.35.

HOWARD BOURNER

As soon as allocations permitted, we reconsidered this bracket and came up with the die casting shown in **Photograph C.** As a result of this development work, we now purchase this part completely finished for $0.15 and have realized annual production savings in excess of $16,000.00. Here again is a perfect example of form that follows function and shows once more that "good design makes sense and dollars too".

FLOOR FURNACE

Even in the manufacture of a product as purely functional as a gas floor furnace, design can be the determining factor in its ability to survive in today's increasingly competitive markets. Recently we have taken another look at our complete line with an eye toward bettering its design for function. Because of this study, several improvements have been incorporated by making relatively low cost tooling modifications — the net result of which has been improved function and appreciable production savings. **Photograph D** illustrates the original assembly and shows the construction used in producing this model. As may be seen, the outer jacket formerly consisted of two end panels, two side plates and a deeply-drawn bottom pan. Final assembly was accomplished by spot welding along 200 inches of joining flanges. →

F →

G →

The re-designed furnace jacket, **Photograph E,** makes use of a one-piece wrap around (sides and bottom) with two end-plates secured by spot welding along 150 inches of joining seam and provides a smooth interior surface which greatly improves the function of this unit. The wrapper for this new furnace is now blanked and flanged in successive operations, then finish-formed by utilizing a comparatively inexpensive bender. This forming tool is air operated and is so constructed that it may be easily adjusted to handle three different sizes of floor furnace jackets.

Improving both structural and appearance value

On the new model, spot welds have been reduced to a minimum by establishing closer quality control over welding equipment and welding procedures, thus assuring maximum effectiveness from each weld operation. The end result is a reduction of 50 inches in seam length with the overall product quality-level greatly improved in both structural and appearance value.

UNVENTED HEATERS

Faced with gradually declining sales volume in small unvented heaters, a study was made to determine the feasibility of continuing the manufacture of a product of this type. After a complete comparison of leading competitive heaters and a thorough survey of consumer acceptance trends, it was decided that a new group of heaters could be designed for salability providing certain basic requirements were met. Our findings indicated strongly that the prospective customer wanted a heater which would remain cool to the touch during long periods of operation. Further, the survey brought out the importance of the psychological aspect of product design. It revealed that the average customer likes to see a lot for his money, and, consequently, when shown two units of equal heating capacity, he will invariably be attracted to the larger model.

Performance consideration

The earlier model is shown in **Photograph F.** The re-designed heater as pictured in **Photograph G,** while being equal in rated heating capacity to the earlier model, is 75% larger and features a cabinet which remains cool to the touch during extended periods of operation. In the development of the new heater, full consideration was given to improving performance, serviceability, economy of manufacturing processes, and the use of new materials.

A radical departure was made from conventional heater design by using a large air intake grille at the lower front balanced by a discharge grille of the same size at the upper front. The picture frame theme of design was utilized with expanded metal inserts forming the grilled openings. Porcelain enamel is used on the entire cabinet to assure a lasting finish and provide a highly desirable textured treatment which adds considerable to the overall eye appeal of the unit.

New design benefits reflected in rising sales

Someone has said "the best looking line in design is the upswing in a sales curve". During the first year of production this re-designed model has enjoyed an increase in sales volume of better than three times that of the previous model. There again we see the value of design for salability. Yes, good design should pay its own way.

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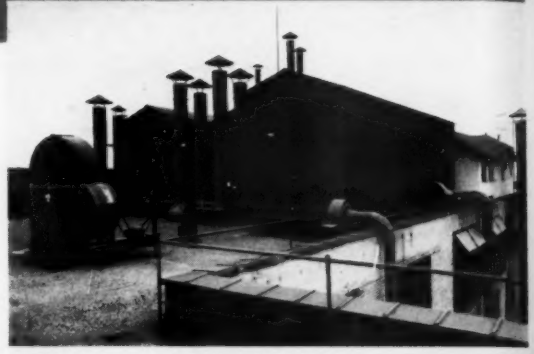

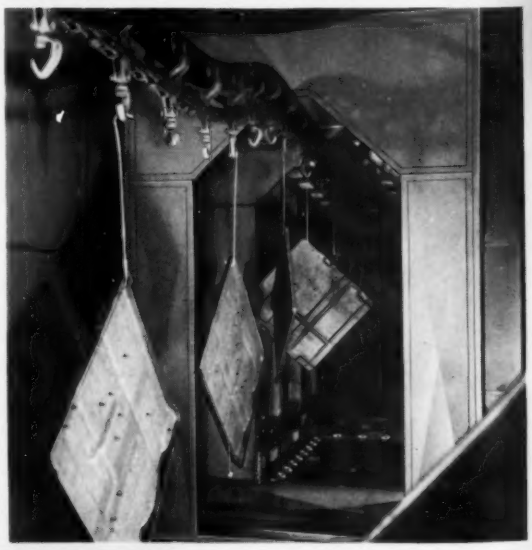

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SYSTEMS' STORY

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Think what this means competitively

Production ranges from small parts carried on trays to large 6'6" x 30" x 30" frame and cabinets of bottle dispenser cases and other types of dispensing units.

Average bake cycle is 15 minutes at 325° F.

Colors include the spectrum in both wrinkle finishes and enamels.

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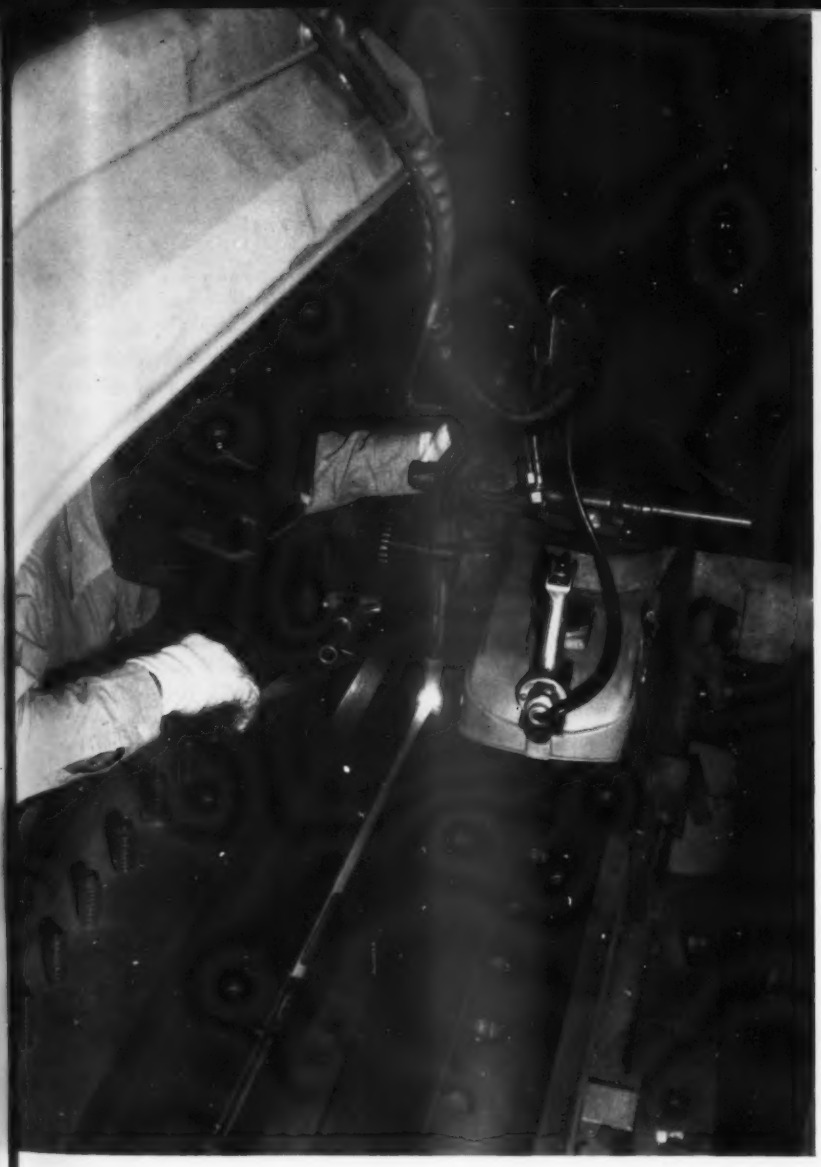


Speeding at 30 inches per minute, an automatic welder fuses the seam of a stainless steel tail-pipe to a General Electric jet engine.

Faster fusion

a two-part article on shielded arc welding

by J. R. Fullerton • CHIEF WELDING ENGINEER, RYAN AERONAUTICAL CO., SAN DIEGO, CALIF.

A revolution in fusion welding has taken place at Ryan. During World War II, thousands of aircraft and engine components were "stitched" together with acetylene gas, atomic hydrogen and metallic arc welding. Today, only metallic arc remains as a member of this fusion welding team.

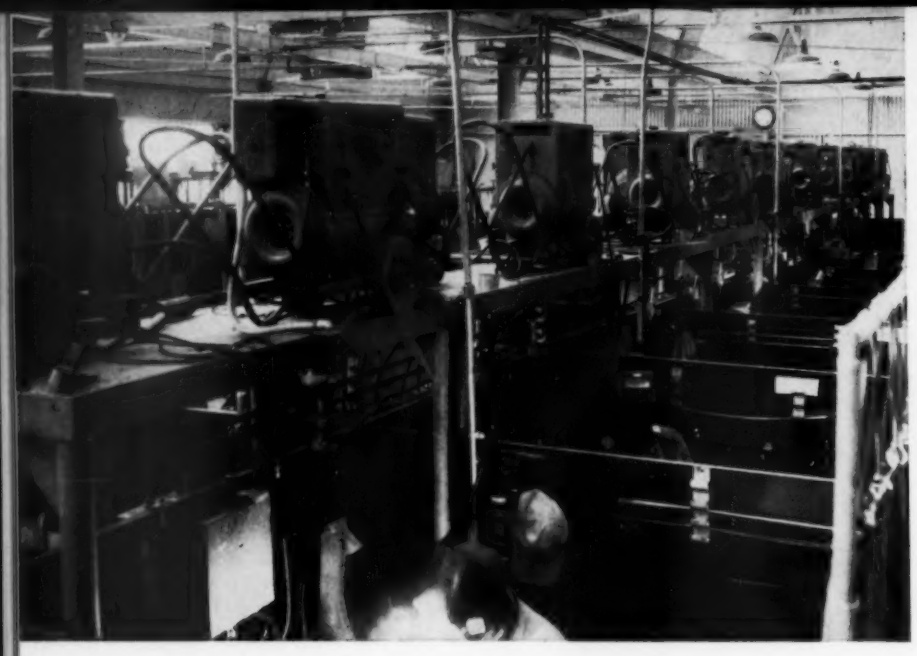
The big switch has been to a newer method—inert gas-shielded arc welding—and our company has converted all acetylene gas and atomic hydrogen production facilities to this technique. Among the first to harness the advantages of new welding processes in the past, Ryan has been similarly progressive in the use of inert gas-shielded welding. Fusion welding stations (169 of them) consume more than 2,000,000 cubic feet of inert gas a year to make the installation one of the nation's largest users of this process.

Fusion welding is the most versatile and useful tool which modern industry has evolved since the days of the village blacksmith. In countless applications it has replaced fastening by bolts and rivets and made possible new structural designs. This is particularly true in high temperature products for jet, rocket and piston engines. Here, the hurricane of heat which they must endure requires that they be as homogeneous as possible. Also, the supersonic flows of fluid through them demand smooth projection-free surfaces to avoid the incidence of turbulence and drag. Inert gas-shielded arc welding incorporates the advantages of other types of fusion welding and permits the joining of many high temperature "super alloys" which could not otherwise be fabricated.

Types of shielded arc welding

New developments in this field have been so numerous that it might be well to unscramble some of the confusion which may exist in the layman's mind. There are five basic types of shielded arc welding in general use. These are: (1) inert gas-shielded tungsten arc welding, popularly called "Heliarc", (2) inert gas-shielded metal arc welding, called "Sigma", (3) submerged arc welding, also called "Unionmelt", (4) atomic hydrogen welding, and (5) coated electrode arc welding.

All of these methods employ the use of a shielding agent, either gas or solid, to protect the hot electrode and weld metals from the oxidizing effects of the atmosphere. While this oxidation can be tolerated in many industrial welding applications, it is thoroughly undesirable in aircraft structures. In jet, rocket and piston engine parts, oxidation produces a brittle, porous structure with reduced



Showing part of 29 welding booths with overhead machines which have substantially increased production of aircraft exhaust systems.

strength and corrosion resistance. Continually subjected to cyclic extremes in heating and cooling, these components must be joined by top quality welds. Similarly, aluminum and magnesium alloy structures must be shielded from oxidation when welded or the hard oxide film which forms may prevent the heating and joining of the metal.

Part I—inert gas-shielded tungsten arc welding

Developed at General Electric Co. by Hobart and Devers, inert gas-shielded tungsten arc welding (Heliarc) is similar to atomic hydrogen welding in that it makes use of a gas for protecting the hot metal. Unlike the atomic hydrogen process, the arc is maintained between a single tungsten electrode and the base metal instead of between two electrodes. Also, the blanketing gas, which flows in a low velocity stream around the electrode, consists of an inert monatomic gas rather than hydrogen. This gas serves only as a shielding agent and does not dissociate to release additional heat as hydrogen does.

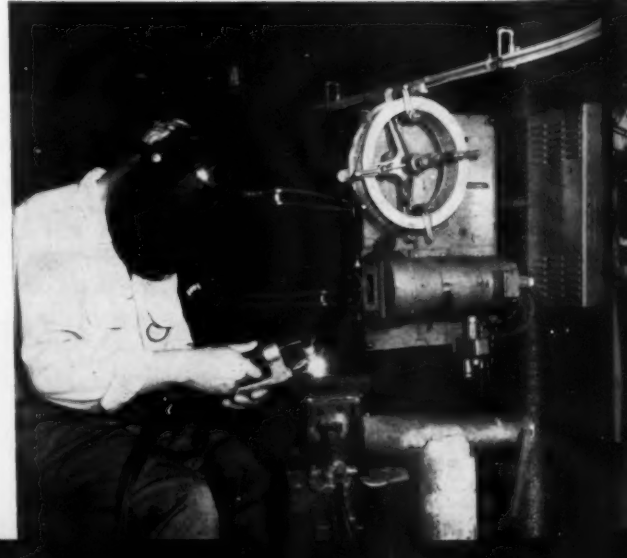
The Heliarc arc is quiet and the tungsten electrode consumption is extremely low. Filler rod may be added by simply feeding wire into the arc. Both a.c. and d.c. systems are used depending upon the materials being joined. Argon and helium-shielded tungsten displays a marked polarity, or rectifying quality. When used with d.c. current, this causes unequal heating at the two ends of the arc. With straight polarity, the electrode operates cool and the work is hot, which is desirable for most metals. For use with aluminum, magnesium or berrylium-copper alloys, however, reverse polarity must be employed, in which the electrode is positive and operates hot with the work cooler.

The outstanding advantages of Heliarc welding are the elimination of flux, increased speed, improved quality and minimized weld finishing. By eliminating the need for flux, Heliarc provided the first successful means for fusion welding aluminum and magnesium alloys, which are attacked by the corrosive elements of fluxes. Without flux, flux entrapment is avoided. This permitted much more latitude in welding design because some joints are certain to entrap flux and often its removal is impossible. Ryan employs Heliarc to weld tee, lap and edge joints which were formerly regarded as impractical to attempt because of flux removal problems.

Speed + pinpoint heat concentration

Heliarc is fast. Full penetration with speeds as high as 40 inches per minute can be attained on 1/16" stock. The pinpoint concentration of heat which this method provides, coupled with its speed, makes it exceptionally useful for welding the stainless steels which the company fabricates. These alloys are subject to carbide precipitation and loss of corrosion resistance when exposed to sustained welding temperatures. Also, the stabilizing elements of columbium and titanium, contained in stabilized grades of stainless steel, may be boiled away if the metals are held at welding temperatures for prolonged periods.

Undoubtedly, these narrow band and high speed heating characteristics have made possible the welding of the "super alloys" used in jet engines. Inconel X and W, Stellite



Combining the speed of automatic welding with the control of manual methods, this new machine feeds wire into the arc between motor-driven rolls.

Like mammoth "flame throwers" for General Electric jet engines, these after-burners must be Heliarc-welded into smooth barrels.

25 and N-155 are extremely susceptible to cracks at welding temperatures because of their poor thermal conductivity and high coefficients of expansion. Normal welding techniques pour heat into these alloys faster than they can conduct it away from the weld zone. As a result, extreme temperature differential is established between the hot and cold portions of the sheet and severe stresses are set up. These phenomena are avoided because of the speed and narrow zone of heating.

This method is efficient for welding practically all of the commercial metals including aluminum, magnesium, copper, titanium, stainless steels, nickel and cobalt base alloys, carbon steels, cast iron, lead and silver. It produces X-ray quality welds which possess good tensile strength, elongation and impact resistance. Its high speed makes it ideal for welding light gauge materials because it reduces warpage and provides attractive appearing welds. The method is used to weld gauge thicknesses running from .035″ to two sheets of .156″.

Due to inherent characteristics and the stabilizing effect of the blanketing gas, the resulting weld deposit is laid down in a smooth bead without sputter or splash. Consequently, the weld seldom requires the grinding or finishing operations which are associated with other fusion welding operations. This is a distinct advantage in reducing labor costs and production time.

We roll all butt welds in austenitic steels, which are accomplished without the addition of filler wire, in especially-designed seam rollers. Built for this work, the machines flatten the weld seam between two steel rolls under heavy pressure. This cold works the weld to refine its structure and eliminates the notch effect caused by the tendency of the metal to sag slightly when molten.

Exhaust systems for aircraft and tanks

All exhaust systems are fabricated with Heliarc welding at Ryan. These structures serve such prominent aircraft as Douglas DC-6 and C-124 Globemaster II transports, Boeing B-50 Superfortress, C-97 Stratofreighter and 377 Stratocruiser aircraft, Convair 240 and 340 airlines, Piasecki helicopter and Fairchild C-119 "Flying Boxcars". The manifolds are also used on General Patton M-47 and M-48 medium tank engines. These structures are fabricated from Inconel, and stainless steel of 19-9DL, 347, 321 and 310 types. Gauges run from .042″ to .095″.

Because of the complex, irregular design of these exhaust systems, they are welded manually. The method is well adapted to this work because it involves light weight equipment with some torches weighing only three ounces. For this work the company has established 29 integrated welding booths in one location. All motor-generators are installed overhead and a cascade system is used to supply argon gas and cooling water. Gas and water are automatically controlled by special timers.

For these tasks, d.c. straight polarity current, ranging from 75 to 100 amperes, is used. Material thicknesses vary in the designs and the welder operator uses a foot control rheostat to vary the welding voltage as he goes. This allows the welder to attain better control of welding conditions and produce a finer weld result.

Instead of adding filler metal to these welds, an upstanding flange is formed at the seams and melted down by the heat of the arc.

Manual methods are also used to weld a wide variety of detailed components for General Electric, Westinghouse, and Pratt & Whitney jet

to Page 66 →

Seams are flattened and refined in one-tenth the time with seam rollers which also eliminate the notch effect caused by the tendency of metal to sag when molten.

WE'VE TAKEN THE HEADACHES OUT OF PHOSPHATIZING!

New Pennsalt Fosbond Process Is Trouble-Free, Dependable

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We'll gladly send you a set of Fosbonded test panels, or Fosbond chemicals with which you can prepare your own panels. Just tell us 1) type metal to be phosphatized, 2) phosphate coating now used, 3) method of application, 4) organic finish used, 5) standards finish must meet.

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A better start for your finish

Pennsalt Chemicals

A plant for applying vitreous enamel to aluminum

including a detailed layout, an outline of equipment requirements, and a brief review of application routine

by J. M. Steele • PROJECT ENGINEER, ENGINEERING DIVISION, FERRO CORPORATION, CLEVELAND, OHIO

Exclusive feature finish

With the development of and increased interest in the use of vitreous enamel for application on aluminum, there are problems to be met in the equipment required for processing which differ from the equipment used for enameling sheet steel. Basically the same steps are encountered, namely:

1. Enamel preparation.
2. Metal preparation.
3. Enamel application.
4. Firing.
5. Miscellaneous.

Let us look at each of these steps separately to see what equipment is required.

Enamel preparation

For the preparation of the enamel the same type of ball mills are required. However, due to the fact that the aluminum enamels do not require "aging" and appear to have a limited usable life, the sizing of the mills becomes important in order that they are large enough to meet the application requirements, but not oversized. Where large volumes of enamel are to be handled, it is conceivable that a multiplicity of smaller mills is preferable to one large unit.

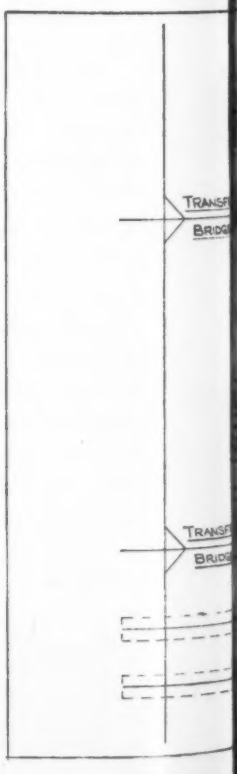
Large storage facilities such as are common with sheet steel enamel slips are not required. Transfer direct to pressure tanks after passing through a 150 mesh screen and magnetic separator appears to be desirable since this would eliminate handling the milled slip twice. If this is not practical, then the slip should be stored in cans with close fitting covers to prevent evaporation and contamination. Since the solids in the slip settle out and compact when subjected to vibration the storage tanks or containers should be kept in a place that is free from vibration.

Metal preparation

The preparation of the metal, in the case of most of the aluminum alloys suitable for enameling, consists of a 15 minute immersion in an acid cleaning bath followed by a cold water rinse. This is followed by immersion in a chromate bath, then a water rinse with a large volume of water. For the acid bath and rinse tank, wood, rubber lined steel or acid proof brick tanks are suitable. The chromate bath and rinse tanks should be of steel. No heating of the acid bath is required, but the chromate bath tank must be heated to 100°—120°F.

Since the time element involved is 15 minutes for the acid bath as compared to 7 minutes (± 1 min.) for cast alloys or 4 minutes (± 1 min.) for the wrought alloys, it is readily apparent that for efficient operation two or three acid cleaner tanks should be included in the plant layout for each chromate bath. After rinsing and draining, following the chromate bath, the cleaned ware should be thoroughly dried in a convection type dryer. Where the volume of ware being processed warrants it, automatic equipment can be supplied for the foregoing operation.

There are some hazards to the operation of the chromate bath. The metal cleaning department must be adequately ventilated for two rea-



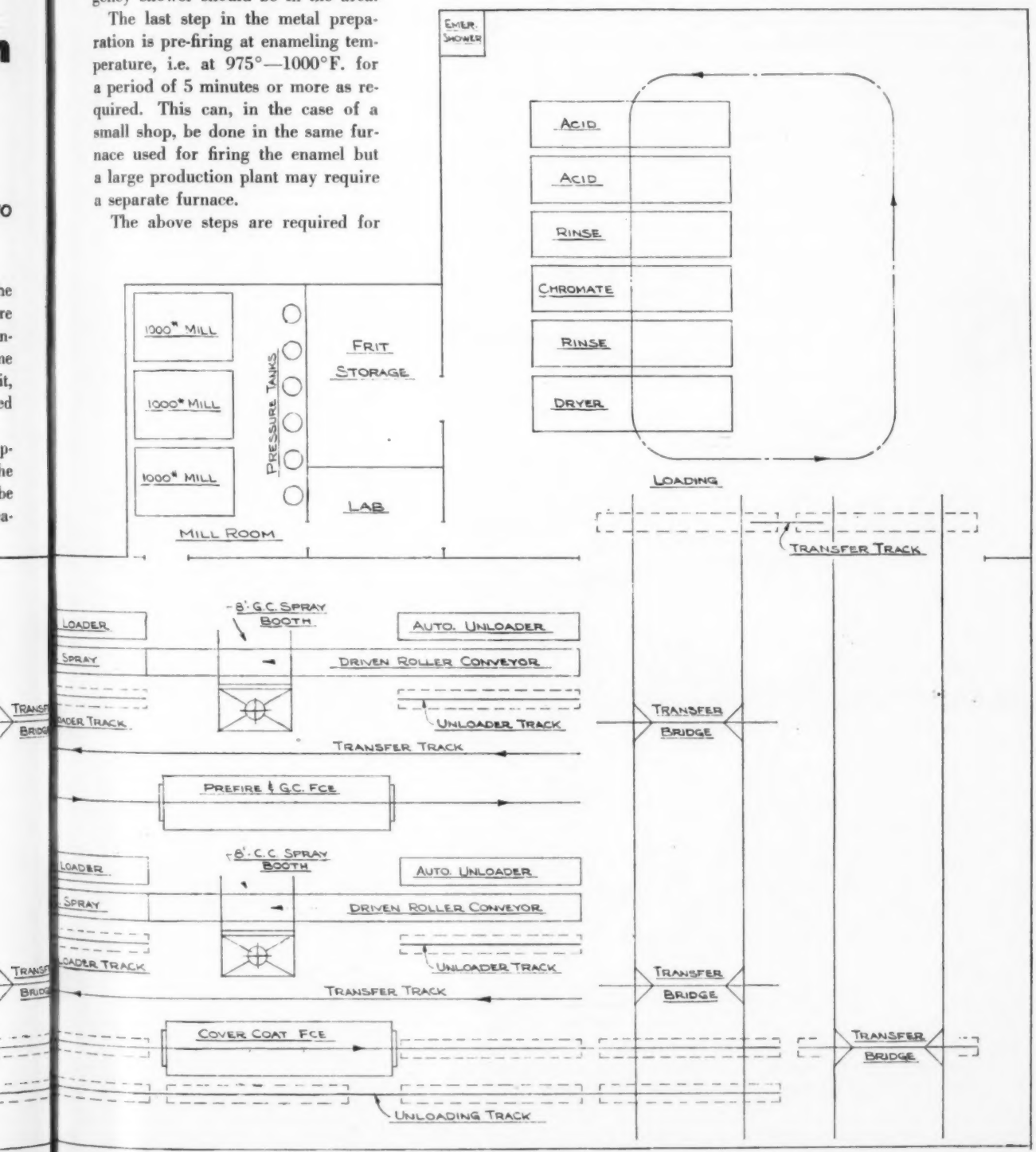
sons: (1) to remove the toxic spray which has a delayed irritating action on the nose and throat and (2) to prevent an accumulation of the evolved hydrogen gas. Because of the caustic and chromate present, the operators should be provided with goggles and rubber gloves. An emergency shower should be in the area.

The last step in the metal preparation is pre-firing at enameling temperature, i.e. at 975°—1000°F. for a period of 5 minutes or more as required. This can, in the case of a small shop, be done in the same furnace used for firing the enamel but a large production plant may require a separate furnace.

The above steps are required for most of the alloys, but in the case of 2 S and 3 S alloy the chromate bath pretreatment and pre-firing operations are not necessary.

Enamel application

Due to the fact that present available enamels have high alkalinity and lead content, it is important that the enamel be applied in a manner which is least hazardous to the sprayers and other employees. Water wash spray booths should be used to remove the maximum of enamel from the air. →



A minimum air velocity of 175 cfh across the face of the spray booth is desirable.

Depending on the type of ware to be sprayed either hand or automatic equipment can be used. The automatic spraying can be done with a reciprocating machine or in the case of long narrow panels, fixed guns with the material moving past the guns at a fairly high speed can be used. Due to the fineness to which the material is milled, the spray guns should be equipped with the type of heads used for paint spraying rather than the heads commonly used for ceramics.

After spraying it is not necessary to dry the stock before firing, except in the case of large panels which must be sprayed on one side, then turned over to spray the other side. It is necessary that the sprayed pieces be fired soon after spraying and due thought must be given to this fact.

It is important that all spraying equipment be cleaned immediately after use. If allowed to stand, the material will solidify in the hoses, guns, etc., making them very difficult to clean.

Firing

For pre-firing, ground coat and cover coats are all fired at the same temperatures—from 975° to 1000°F. and ± 5° variation is the maximum allowed to insure satisfactory firing. A time of 5 minutes at temperature is required plus the heating up time which will vary with the thickness of metal, load in furnace, etc.

Due to the low temperature and uniformity of control required, convection heating appears to be the logical method of firing aluminum enamels. This is particularly true of batch type or intermittent type furnaces. For certain types of continuous firing, direct radiation can be used successfully.

Since, in firing, the furnace atmosphere should be free of any products of combustion, electricity is the ideal source of heat. It can be used in either of the two heating systems mentioned in the preceeding paragraphs. Gas can be used as fuel in radiant tubes over which air is circulated for heating. At the present time some experimentation is being carried out using direct gas firing for the pre-firing and ground coat fires. To date, the results are not conclusive.

The construction of the furnaces used, because of the low temperature, will involve insulating refractories and insulated panel construction. Where convection heating is used, ductwork of heat resisting alloys and insulated panels, with the surface exposed to the circulated air of the same material will be used as insurance against scaling. In furnaces utilizing radiation from electric elements, where no forced circulation is involved, furnace linings of insulating refractories can be used.

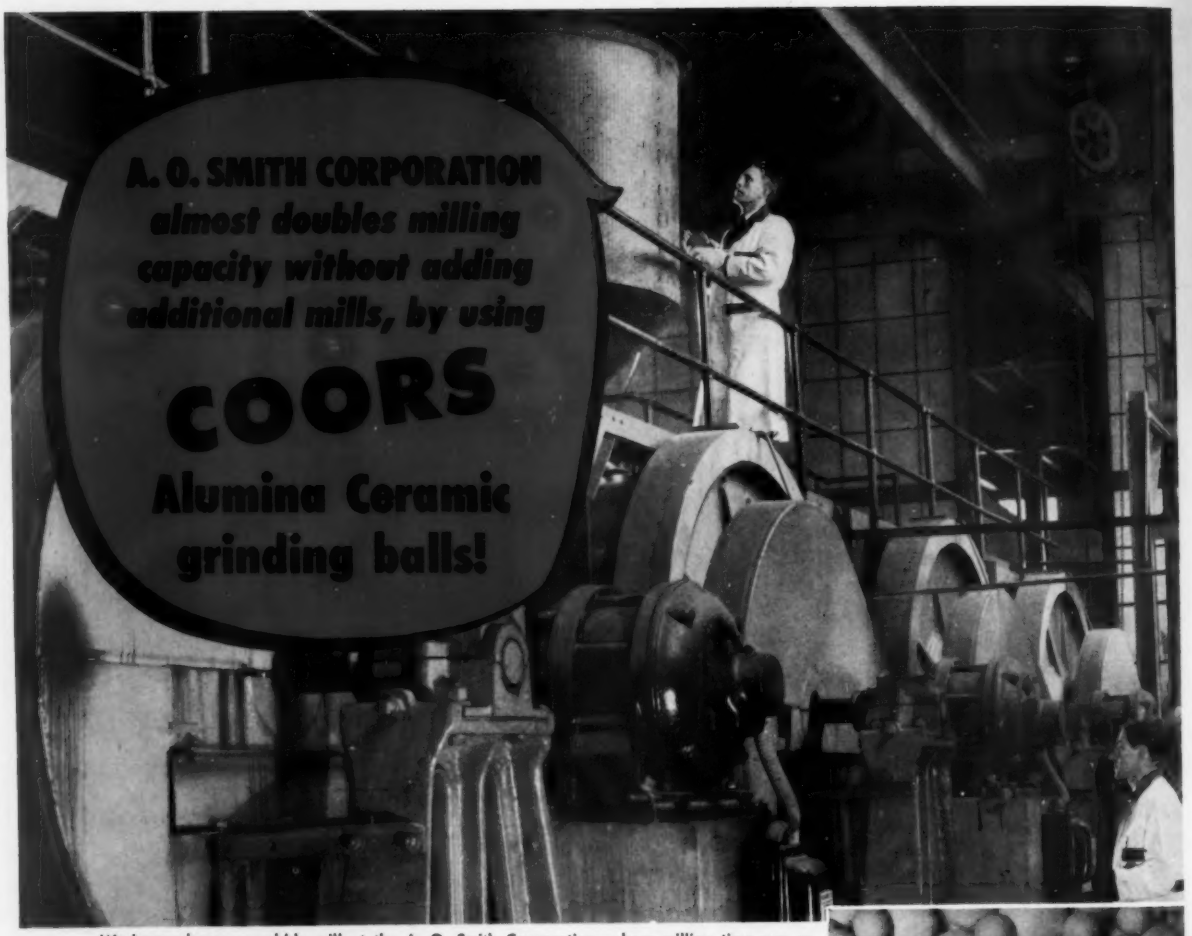
The selection of the proper type of furnace is, to a large extent, dependent on the size and shape of ware to be handled. Large sheets finished on both sides require hanging from an overhead conveyor. Long architectural panels, requiring a good finish on one side only, can best be loaded on racks for firing. The nature of the metal and the proximity of the firing temperature to its softening point present some problems in providing the proper loading methods to prevent distortion. The long firing cycle and multiplicity of firings required indicate that, in many instances, two or more furnaces are preferable to one large unit.

Miscellaneous

Wherever possible, either overhead or laydown conveyors should be used to eliminate handling of the material. It is conceivable that for some prod-

to Page 66 →

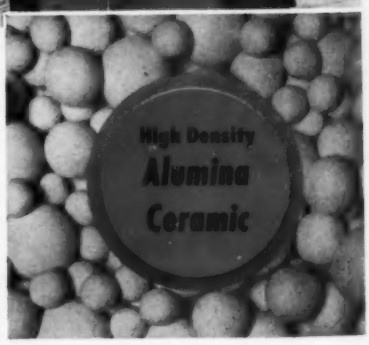
"WELL, I'LL TELL YOU, I ALWAYS WORE THOSE LOOSE-FITTING OVERALLS IN THE SHOP, AND THEY WERE CONTINUALLY GETTING CAUGHT IN ONE OF THE MACHINES."



Workmen charge a pebble mill at the A. O. Smith Corporation—where milling time was reduced 46%—from 5,800 revolutions to 3,100 by using Coors Alumina Ceramic Grinding Balls.

The use of Coors High Density Grinding Balls, according to actual experience in enameling plants, will produce these results:

1. **Permit you to obtain greater output per mill.**
2. **Reduce cost of balls because of much lower ball loss due to wear.**
3. **Increase the life of your porcelain mill linings when mills are properly charged.**



A. O. SMITH CORP. EXPERIENCE SHOWS:

"We find that to produce the proper fineness, 3,100 revolutions per batch are required with your Alumina Balls [in a 5'x6' mill]. With the previously used balls, 5,800 revolutions were required for the same fineness, or nearly twice the time requirement.

"This improvement in grinding cycle time means that we can almost double our productive capacity without adding additional mills. Besides the cost and difficulty of obtaining new mills, the floor space saving effected for increasing the capacity is often important...

"...31 batches of glass-lined slip have been ground in this mill with no additional [Coors Alumina] balls being added for wear. Our previous records reveal that with conventional balls, we were having to add 12 pounds of balls per charge for ball loss during each cycle of grinding."

You can get similar savings in your own mills. Write your Coors representative, today!

Available from stock in sizes 1", 1¼", 1½", 1¾", 2" and 2½" and in the new Natural Shape Media.

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- No Chipping or Cracking
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GOLDEN, COLORADO

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Sole Agent for the Enameling Industry... East of the Rocky Mountains, Chicago Vitreous Enamel Product Co., 1427 South 55th Court, Cicero 50, Illinois.

California sales representative...Melvin L. Jantz Company, 5028 Alhambra Ave., Los Angeles 32, California.

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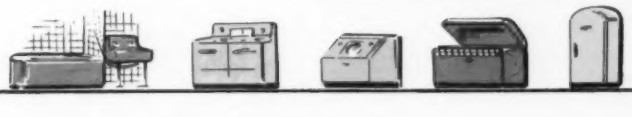
PEMCO SALES ENGINEERS ARE AT YOUR COMMAND . . . THEY CAN SCHEDULE A TRIAL RUN IN YOUR PLANT. Want fast action? Call Pemco.

WORLD'S FINEST PEMCO



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at Whirlpool

Yes . . . Rotospraying is the accepted method of sieving enamel slip at the Clyde Porcelain Steel Div. of the Whirlpool Corporation. Rotospraying assists in the proper cleaning of milled enamel to insure against contamination, and to help in the production of Whirlpool washing machines.

And throughout the enameling industry hundreds of Rotosprays are on guard for the proper cleaning of milled enamel and to help in the production of the finest quality enamel finishes for washing machines, ranges, refrigerators, sinks, bathtubs — in fact for all types of enameled products.

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Photo shows Rotospray in operation in the Clyde Porcelain Steel Div. of Whirlpool Corp., Clyde, Ohio.

Contact us direct or one of our authorized representatives.

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The history of phosphatizing

historical treatment of a subject of growing importance to all manufacturers of fabricated sheet metal products

by Dr. L. K. Schuster • CHIEF CHEMIST, HEINTZ MANUFACTURING CO., PHILADELPHIA

IN THE first centuries of our time, the mighty Roman Empire embraced most of Great Britain, France and Western Germany. The Romans built mighty fortresses to fortify natural barriers, such as the Rhine and Danube rivers. It is in one of these Roman fortresses where "The History of Phosphatizing" begins.

From the excavations in the Roman fortress of Saalburg, near Frankfort on Main, arms and household wares made of iron were found which possessed an excellent rustfree surface. They were covered with a coating of water insoluble ferrous phosphate, identical with the phosphate mineral "Vivianite." Since this mineral or other natural phosphates do not occur in the neighborhood of Saalburg, it might be assumed that the Romans, in one way or another, produced this protective coating. Therefore, it might be that the first commercial use of phosphatizing dates back as far as the 3rd Century A. D.

In 1849, de Bussy observed that the corrosion resistance of steel could be markedly improved by heating a steel article to red heat and treating it with a mixture of dicalcium phosphate and iron powder. The English Patent 3119, granted in 1869 to G. Ross, is of particular interest. To increase the corrosion resistance of steel, Ross recommended heating it to a red heat and then immersing it in phosphoric acid. The main application of this process which Ross had in mind was very peculiar—to increase the protection against perspiration, of small steel strips used in women's corsets—apparently their stays at that time.

We can also find a forerunner of our modern iron phosphate coatings produced with alkali or ammonium phosphate solution in the early patent literature of the 19th Century. German Patent 6968, issued in 1879, suggests treating heated steel articles in a solution of alkali and ammonium phosphate.

Editor's Note:

This article by Dr. Schuster represents the first in a series to be published during 1954 on phosphatizing and other important phases of metal preparation—subjects of increasing importance to all fabricators and manufacturers of metal products. This article serves as an historical backdrop for material on phosphatizing.

It is quite plausible that these early attempts to commercialize phosphatizing could not succeed and were, therefore, not recognized by the industry.

A half century passed until the pioneer work of an Englishman, T. W. Coslett, made modern phosphatizing an important feature of the metal finishing of today. In 1906, Coslett obtained a patent suggesting the treatment of cleaned steel articles in diluted, boiling phosphoric acid. In this patent Coslett further suggested, "to add a suitable substance, such as iron filings, ferrous phosphate or another appropriate compound being employed for controlling or regulating the rapidity or strength of the chemical action upon the metal or articles undergoing treatment."

Early ideas on phosphatizing

It can be seen that Coslett's patent suggests two important steps which made industrial phosphatizing feasible and practical: (1) to immerse the steel article, at room temperature, in a hot solution of phosphoric acid compounds, and (2) to decrease the pickling action of the phosphoric acid in order to accelerate the formation of the phosphate coating by employing acid metal phosphates. Coslett recognized also the limited corrosion resistance of phosphate coatings and suggested an after treatment with diluted chromic acid and/or finishing with protective oil, paint or other organic finishes. In other words, Coslett discovered the paintbonding qualities of phosphate coatings.

Two years later Coslett substituted zinc phosphate for the iron phosphate.

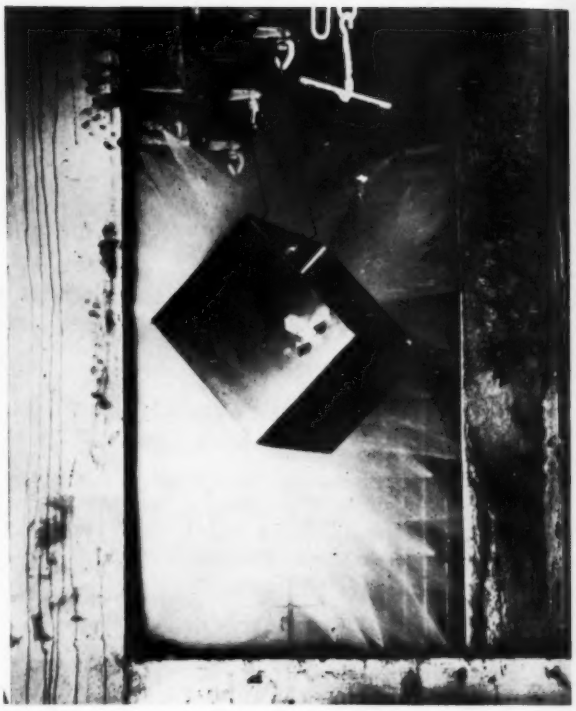
Coslett's process was well accepted by industry; known as "Coslettizing" it was rather widely used in England, Netherlands, and other European countries for phosphatizing the steel parts of bicycles and other articles.

There are several reasons why Coslett was denied a final and lasting success. Soon after issuance of his basic patents, described above, he discontinued his research work on phosphatizing. The way Coslett commercialized his invention was inadequate. He sold his formulae and "know how" for a royalty. Coslett did not realize that the merchandising of special phosphatizing chemicals

and rendering technical service to the customer was a more successful way to spread phosphatizing to industry.

The second commercial phosphatizing bath is based upon an invention of R. S. Richards, who, in 1911, obtained an English Patent which recommends the use of primary manganese phosphate and phosphoric acid to coat steel articles.

In this country, W. H. Allen is considered the first to recognize the technical and commercial possibilities of phosphatizing. Several patents granted to Allen in the years 1915-1918, dealt particularly with the "manganese phosphate type" phosphate baths. Allen also advised suitable manufacturing methods for phosphate chemicals. He established proper concentrations, ratios of metal phosphate to phosphoric acid and efficient operating conditions of working baths. Allen's patents formed the basis of commercialization of phosphatizing in the U.S.A. where it was soon well accepted by the metal-fabricating industry. The steadily growing automobile industry was a natural field of application.



A steel television cabinet enters a sprayer for application of phosphate coating to increase paint adherence and protect the metal from corrosion.

Disadvantages of first commercial processes

However, Coslettizing and other early processes were not suited to the needs of the rapidly expanding finishing industry. Some of the disadvantages of the early coating processes were:

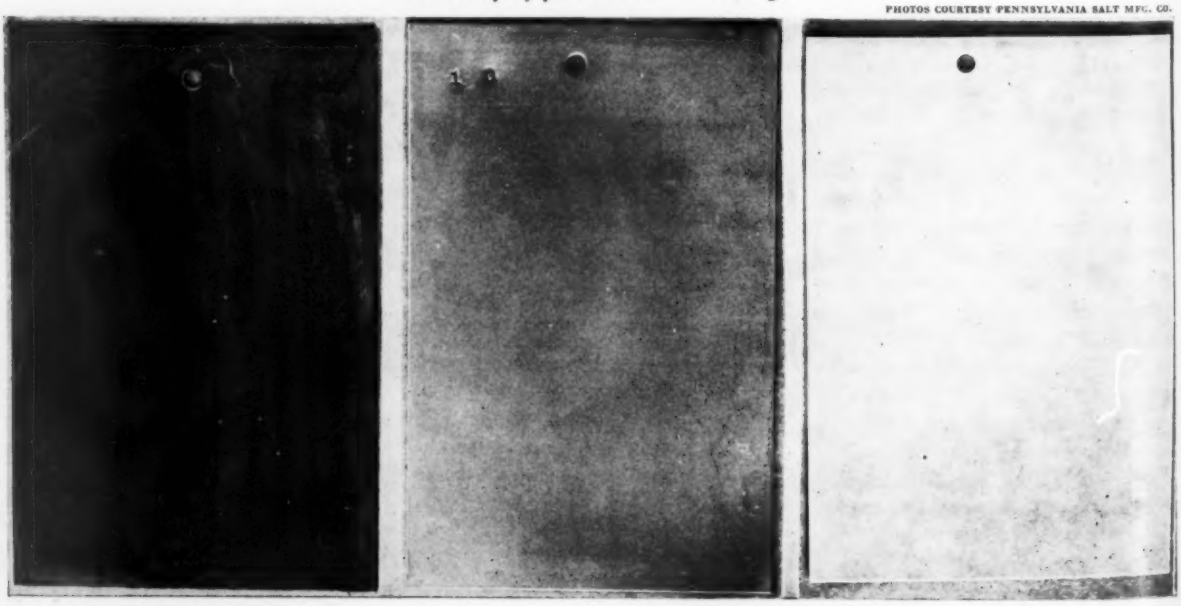
1. Very long treatment time, sometimes up to several hours.
2. High consumption of chemicals.
3. Great formation of sludge.
4. Short life of phosphate bath.
5. Difficult control and maintenance.
6. Coarse and heavy phosphate deposit.

It is understandable that these disadvantages prohibited the use of the early processes in a conveyorized or line finishing system. The coarse and

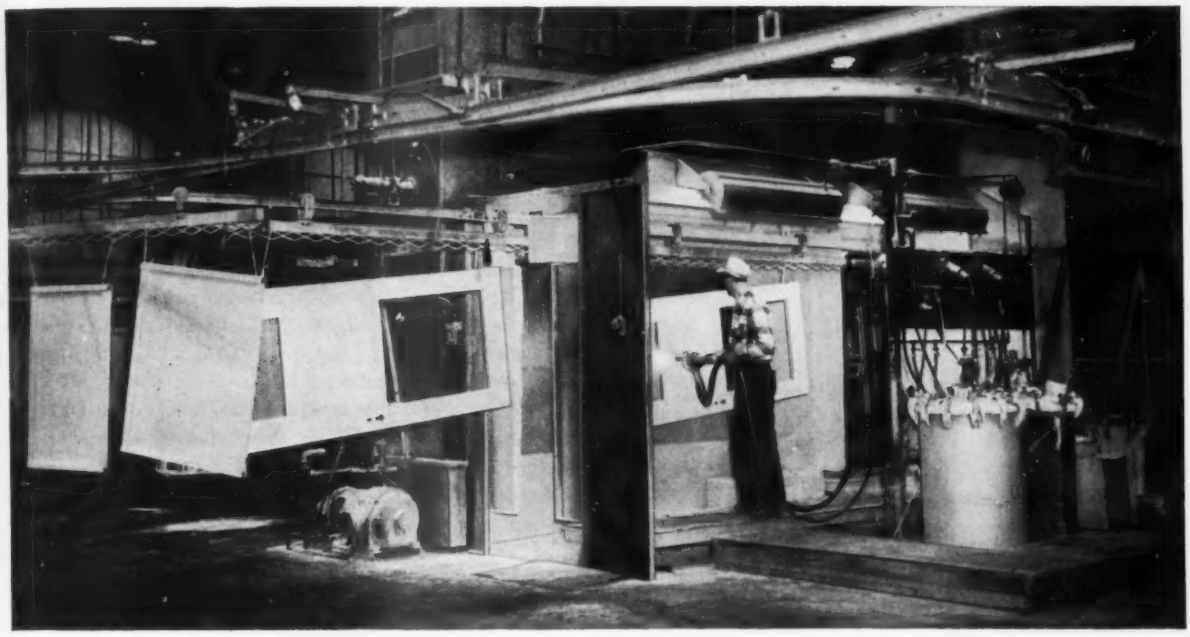
to Page 68 →

Steel received in the fabrication department may be rusted and soiled like the panel at the left. The center panel has had this rust and soil removed and then has been coated with a phosphate coating. The panel at the right has been spray painted over this coating.

PHOTOS COURTESY PENNSYLVANIA SALT MFG. CO.



DeVilbiss helps you get the most from the spray method



Panels, doors and fittings for Movable Interiors are given a prime coat of enamel in DeVilbiss Water-Wash Spray Booth — one of eight at The E. F. Hauserman Company.

Lifetime finish applied to movable walls with DeVilbiss equipment

The E. F. Hauserman Company uses eight DeVilbiss Spray Booths in its busy production line to paint movable wall panels, doors and fittings.

"We like DeVilbiss' versatility for our Movable Steel Interiors . . . it does a good job for us," says Don Clapp, general superintendent of The E. F. Hauserman Company, Cleveland, Ohio – the nation's oldest and largest manufacturer of movable partitions and wainscot.

One of the attractive, money-saving features of Hauserman Movable Interiors is that they'll stay new looking almost indefinitely *without repainting!* This feature alone saves thousands of dollars in maintenance costs for offices, schools, laboratories, hospitals and industrial plants that use Hauserman Movable Interiors. Hauserman uses DeVilbiss equipment extensively – Spray Guns, Spray Booths, Pressure-feed Tanks, Hose and Connections – to apply its exclusive, lifetime surface finish to its products.

If you, too, would like to get the most from the spray method, get full data about DeVilbiss equipment from your nearest DeVilbiss jobber or branch office, today. Or write us direct for free literature.

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Spraying saves one-fourth the time . . . up to 50% in overall painting costs. On many surfaces, like acoustical tile, it is the only practical method.

Automatic spraying is cutting costs for many manufacturers. DeVilbiss has a wide variety of standard automatic spraying machines to serve you.

For fully coordinated spraying equipment: Spray guns, air compressors, spray booths, hose and all necessary accessories, DeVilbiss can serve you best.

FOR BETTER SERVICE, BUY
DEVILBISS

What is happening to one-coat porcelain enamel finish

To Finish:

"In re-reading the various statements presented ten years ago I have no reason to change what was said.

"The attainment of the goals has been achieved, at least partially, and the one-coat white enamels applied directly to the steel base are now closer to commercial practice than ever before.

"Certain shops are successfully applying in daily production white finish coat directly to special steel without the conventional ground coat. Newer processes of treating metal surfaces and better enamels already available experimentally insure ultimate commercial success. Industry's need will be the deciding factor. When the demand is such that the producers of porcelain enameled articles insist on one-coat white porcelain enameling, materials, methods and improved control will make the production of one-coat white not only possible, but of common practice."

G. H. McIntyre
Vice President & Technical Director
Ferro Corporation

To Finish:

"While some elements of the statements of 1944 still apply today, the goal of one-coat porcelain enamel finishes is 10 years nearer to being attained than when those statements were made. There has been considerable improvement in metals, frits, and application procedures during the past 10 years and some experimental production is being carried on. Nevertheless, considerable additional improvement is still needed, particularly improved adherence between metal and enamel, for single-coat white porcelain enamel finishes to be employed broadly.

"The general desirability of porcelain enamel finishes and the economic motivation for accomplishing this in one operation will provide sufficient impetus to stimulate the research activity necessary to solve the problems still remaining."

T. F. Olt
Director, Research Laboratories
Armco Steel Corporation

AS an additional anniversary feature, *finish* is presenting spread feature as a sequel to an identical feature which appeared January, 1944, issue, under the ing, "Will We Have One-Coat Por Enamel Finishes Applied Direc the Base Metal?"

At the time of this first featu approached laboratory directors leading steel producers and the ducers of porcelain enamel frit logical sources for information subject which was then in the of most companies using porcela amel as a finish.

To Finish:

"We can only repeat our earlier statement with more emphasis and with the added assurance which the experiences of the last ten years have given us.

"There is no question but that progress has been made in the development of one-coat porcelain enamel finishes for general use, but all that has happened in this last decade only gives emphasis to the three-sided nature of the problem. It isn't going to be done by any miracle porcelain enamel or now unknown base metal or some new phenomenal process. When we have licked the problem, we'll find it has been because of improvements in both materials and processes, along with a still larger measure of precision and good practice in all of the operations beginning with the raw materials through to the finished product."

Richard H. Turk
President
Pemco Corporation

plied directly to the base metal?

To Finish:

"Considerable progress has been made in the application of white enamels directly to steel without the use of a ground coat. Titanium opacified enamels apparently have the opacity required for a one-coat white. However, more fundamental information on adherence is necessary before one-coat white will be practical.

"Some of the special steels made for this type of application are showing promise but more uniformly good base metal is necessary to make this program a success.

"Besides careful control of the various enameling operations, careful handling of the steel sheets to prevent scratching prior to enameling is a must for a good one-coat white finish."

Roger L. Fellows
Manager, Frit Division
Century Vitreous Enamel Company

presenting this 10th Anniversary el, we thought it in order to ap- h the same technical men or their essors in the same companies that lied information for the 1944 fea- In these six communications en specifically for *finish*, readers get the current opinion on this tion which is so important to the lain enameling industry.
r editors wish to assure all inter- readers that space will be provided ditional opinions, either from the metal or raw material suppliers, om enamel plant operators inter- in this subject.

To Finish:

"The commercial application of white acid-resisting porcelain enamel directly to the metal base was little more than a dream ten years ago. Now it is a reality! Sizable tonnages of ferrous sheets are going daily into highest quality products enameled in this manner.

"The hope for a more chip-resistant product has been fully realized together with over-all economy even with a rather high premium base metal.

"This finish seems firmly established and, in our opinion, will grow tremendously in use as the base metals become more available."

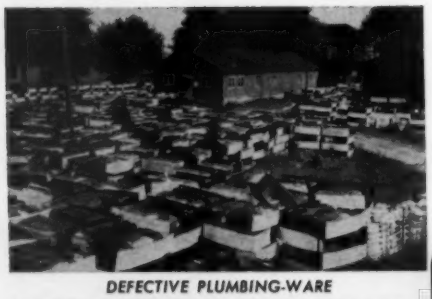
Frank R. Porter
Section Head, Surface Treatment Section
Research and Development Department
Inland Steel Company

To Finish:

"It is very interesting to note that the predictions of ten years ago are now beginning to crystallize into an accomplished fact. The attainment of commercial production of cover coat directly to the base metal has been recorded in *finish* and in the records of those companies who have been and are doing "white direct-or." The feasibility of commercially producing what was considered a laboratory possibility ten years ago has been demonstrated by several companies and will be adopted by others in the not too distant future.

"The early predictions of the experts have been borne out by the later developments: closer control of process, improvements or developments in steel, frit, and application techniques are essential to the attainment of one-coat direct-on white. The reticence of manufacturing concerns to expend money and effort to incorporate the process to their product will probably be the only deterring factor in the adoption of it by the entire enameling industry."

E. E. Howe
Director of Research
Chicago Vitreous Enamel Product Co.



DEFECTIVE PLUMBING-WARE

DEFECTIVE WASHERS AND RANGE TOPS

THE CAUSTIC BATH

THE WASH-OFF

SANDBLASTING

D-ENAMELING IS FOR COST-CONSCIOUS MANAGEMENT ONLY

During the past three years D-Enameling has made it possible for appliance manufacturers to transform scrap loss into profit dollars. As a result, D-Enameling has become a permanent part of the appliance manufacturing picture among plants whose management is seeking every possible means of effective cost control.

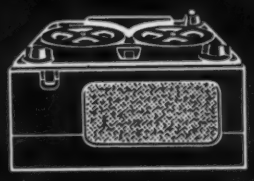
So, if you're interested in cost reduction (and who in management isn't), it will pay you to learn all the facts about D-Enameling. Let us give them to you soon, won't you? In the meantime if you'd like to see some D-Enameling results for yourself, send us 3 or 4 samples of the part you are particularly interested in. We'll D-Enamel them at our expense. Then you be the judge.

New Process *D-Enameling* Corp.

Highland and New Haven Avenues • Aurora, Illinois

PREVENT Rust with MACCO BLUCOAT

the amazing between-operation rust proofing solution



RECORDER precision parts are being given the Macco Blucoat Rust Preventive treatment by one of the nation's leading electronic manufacturers.

GEARS cut, ground and tempered are treated with Blucoat to prevent rust during storage, shipping and assembly.

CARBURETOR bodies and large engine castings being treated with Macco Blucoat to prevent rust after machining and during storage.

AUTO bodies of one of the world's largest body manufacturers are given the Blucoat treatment to prevent rust before painting.

***MACCO CASE HISTORY**

Blucoat is the almost unbelievably efficient and time-tested rust preventive used by leading metal processors and fabricating manufacturers the country over. They endorse its use as the only practical method of preventing rust between production operations and assembly —and during interplant transportation and storage.

5 REASONS FOR BLUCOAT'S NATIONAL ACCEPTANCE:

1. Blucoat is water soluble, making it economical, yet extremely efficient.
2. Blucoat is adaptable to an almost unlimited variety of applications and conditions.
3. Blucoat's powerful rust inhibitor works equally well on steel, cast iron, forgings or die castings.
4. Blucoat leaves no oily film—adheres better to metal—collects less dust, chips, etc.
5. Blucoat has withstood perfectly a salt spray test of more than 80 hours. Vastly superior to soluble oil, it contains no poisonous elements. No alcohol, making it exceptionally stable.

For the prevention of rust, Blucoat positively has no equal. Whether the product be the finest of automobile bodies or simply bale tie-wires, Blucoat's versatility makes it most indispensable for any metal processing plant.

Write today or call a Macco sales engineer. Phone Prescott 8-0500, Chicago.

*Actual Case History available on request.

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Plastic tooling for metal working discussed at plastics conference

THE metal working industry is making more and more use of plastic tooling, according to Fred Lyijynen, of the automotive division of Chrysler Corp.

At the 9th annual meeting of the Reinforced Plastics Division of the Society of the Plastics Industry, Inc., Lyijynen stated that in the automotive industry, plastic dies and fixtures are being used in the production of experimental parts, parts which may require design changes before going into full production, and for starting early production while steel dies are being made. The meeting was held February 3-5, at the Edgewater Beach Hotel, in Chicago.

Plastic dies being used in longer production runs

While plastic tooling has been used mostly in short runs in the past, longer and longer production runs are being made with plastic dies and fixtures. He quoted a recent survey which showed that the share of total tooling taken over by plastics in the automotive industry is now 15%.

Lyijynen, supervisor of the experimental plastic division of Briggs Mfg. Co. (now taken over by Chrysler), stated that their reinforced plastic department is a much used and necessary link in the chain of tooling requirements.

"In the process of tooling up for our last style change, a series of reinforced plastic fixtures were submitted and tried out in actual production. Their durability and accuracy were maintained, even after the rough handling required by high production methods. In many cases, production was increased due to the compact construction and lighter weight made possible by the use of one-piece reinforced plastic fixtures," he said.

Continuing, Lyijynen stated that the cost of plastic tooling in most cases is "only a fraction of the cost of equal tooling made of steel, and the speed with which reinforced plastic fixtures can be produced has assured us of quite an extensive program in forthcoming style changes."

Representatives from several leading appliance companies showed keen interest in plastic tooling, and discussed the subject at length with Lyijynen following the meeting.

Plastics production up 30%

During the conference, it was brought out that in 1953 the plastics industry produced approximately 3,000,000,000 pounds of raw materials. This figure, as estimated by the Society of the Plastics Industry, Inc., is 30% above the actual production of synthetic resins in 1952.

Prospects for 1954 appear to be fairly satisfactory, according to SPI, and indicate a small increase of perhaps 5% over 1953, or about 3,150,000,000 pounds of plastics raw materials. This year SPI estimates that these products will be valued at $1,575,000,000.

Report of sub-committee on housings and appliances

E. F. Bushman, of plastics division of General American Transportation Corp., Chicago, reported on the work of the SPI Sub-Committee on Housings and Appliances in regard to establishing standards.

It was pointed out that a survey made among major appliance manufacturers disclosed the majority opinion that standardization of reinforced plastics products in the housings and appliances field was premature. However, said Bushman, engineers and materials scientists of these firms indicated a very active interest in reliable engineering data and information on reinforced plastics materials.

Bushman stated that his committee decided that the job of standardizing reinforced plastics was too vast to be accomplished in a few years, and that the number and types of applications must increase before actual standardization can be undertaken.

However, the committee agreed that it would undertake the following program which it would try to complete within the next two years:

1. Define the product scope of the committee.

2. Study the problems of product standardization so they can be ready to refer to a larger industry-wide committee at a later date.

3. Prepare an informative guidebook to reinforced plastics applications in the housings, appliances and related fields. This is to be an engineering and contractural aid to proper design, selection of materials

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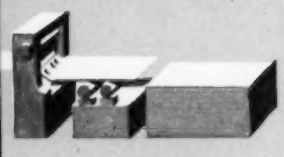
Left: Geo. Burton, of Hotpoint, and E. F. Bushman, of Gen. American Transportation, discussed plastic tooling with Fred Lyijynen, of Chrysler.

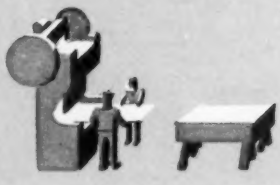
Right: Also interested in plastic tooling were W. W. Castor, of Castor Engr.; and R. S. Buchanan, of Westinghouse major appliance division.

problem....HOW TO CUT STEEL COSTS

Both systems begin with mill coil. However, if you are now buying sheet you are faced with the following costs.



For mill cutting to random lengths, simply shearing to reach sheet form, add **$.20** per hundred weight to basic steel cost.



For squaring to tolerance at the mill add another **10 percent** to your basic steel costs.

Then for wrapping and palletizing to keep the sheet clean and easy to warehouse **add an additional $.025** to the costs.

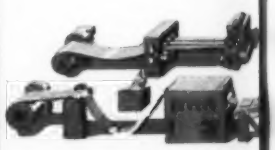
The steel, of course, must be delivered regardless of form.

solution....A WEAN SLITTING and SHEARING

With the Wean system you buy coils, simply prepared . . . eliminate mill extras. Delivery is of comparatively few width sizes.

The fewer sizes . . . the smaller purchasing and inventory staffs required.

And you save approximately 30 percent in storage area.



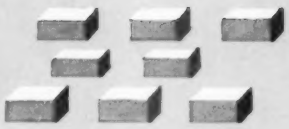
The Wean Line converts the coil of steel to resquared multiples at rates up to 200 feet (or 100 cuts) per minute. Tolerance control is easily held within accepted

Actual Savings in Steel Costs of 20%

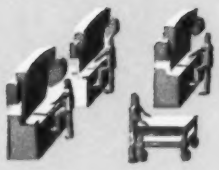
To many steel fabricating people this amazing speed of cutting to length to resquared tolerances has seemed unbelievable. But to many others, who have seen one of these Wean lines in operation, talked with people who operate them, gone over actual figures, this is a production line "must".

When we say savings up to 20 percent in your steel costs we mean just that. Total up the costs approximated above . . . check them against the book . . . against your own cost sheets. Find out what you're paying for getting steel from coil to final sheet size, ready to form. If it's more than a dime a hundred weight then you should know all about the Wean line. Get in touch with one of the offices listed below and let a qualified Wean representative work with you — using your figures if you wish — in proving the Wean line can effect a substantial savings where you and your operations are concerned.

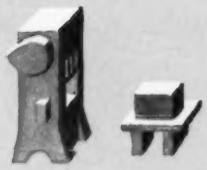
Where you're buying sheets of various sizes you'll require about **30 percent more help** in your purchasing and inventory control departments.



And about 30 percent more space in your warehousing set-up.



Then, if you further resquare to multiples in your own plant you're paying an additional cost of at least $.35 per hundred weight.



Thus, prior to fabrication, you have added approximately $1.10 to every hundred pounds of steel, even though you are using plain light gauge metal.

range. The entire "extra" cost prior to fabrication here . . . just a fraction of the $1.00 plus per hundred weight cost of standard methods.

Wean

COMBINATION SLITTING and SHEARING SYSTEMS

WEAN EQUIPMENT CORPORATION OFFICES

CLEVELAND

CHICAGO **NEWARK, N. J.** **DETROIT**

Cable Address: WEANCOR

Try Century Vit
TITANIUM WHITE

1. COLOR STABILITY
2. HIGH REFLECTANCE
3. HIGH OPACITY
4. GLOSS
5. TEXTURE
6. WORKABILITY

With Century Vit Titanium cover coat over Century Vit ground coat enamel you have an unbeatable combination for adding beauty and durability to your appliance or other metal product.

Century frits are *time proved* in production plants before they are sold to you. The titanium frits give you the six characteristics: color stability, high reflectance, high opacity, gloss, texture and workability, so important to your plant and finished product.

Then too — you will save money 1) in frit cost and 2) on the production line.

A Century field engineer can show you how to improve your product and save money too if you will let us hear from you now.

FRIT from CENTURY FRIT MASTERS

CENTURY VITREOUS ENAMEL COMPANY

• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •

Industry enameler's clubs meet — midwest and west coast

west coast club elects new officers and executive committee

A GALA "kickoff" meeting on January 27, in Los Angeles, inaugurated the 1954 activities of the Pacific Coast Enamelers' Club. Newly-elected club president, Glen Fulton, of Norris-Thermador Corp., provided a preemptory challenge to the some 75 members present. . . . "We're going places this year!"

To lend emphasis to his words, Fulton then described two special meetings during which the new officers had set up four working committees and selected a chairman for each. George Fulton, of The DeVilbiss Co., was chosen to head the program committee; Bert Slevin, of The O. Hommel Co., chairman of the membership committee; Hyman Leggett, of California Metal Enameling Co., leads the publicity committee; and Bruce Young, of The DeVilbiss Co., spearheads the entertainment committee.

Each committee chairman then spoke briefly, outlining the year's program and requesting suggestions.

Pacific Coast club's officers and committee chairmen: S. Remine, Gaffers & Sattler, asst. sec.-treas.; Hyman Leggett, Cameo, publicity; W. C. Blackburn, Ferro, vice pres.; H. L. Wareham, Norris-Thermador, sec.-treas.; Glen Fulton, Norris-Thermador, president; Bruce Young, DeVilbiss, entertainment; George Fulton, DeVilbiss, program; and Bert Slevin, Hommel, membership.

Other club officers include: W. C. Blackburn, of Ferro Corp., vice president; H. L. Wareham, of Norris-Thermador Corp., secretary-treasurer; and S. Remine, of Gaffers & Sattler Co., asst. secretary-treasurer.

Also, during the election of officers, an executive committee was elected for the first time. Members of this committee, to serve one, two and three years respectively, are Roy Armour, of Chemical Process and Engineering Co.; Joe DiSario, of Smoot-Holman Co.; and Al Sattler, of U. S. Porcelain Enameling Co.

To wind up the meeting, Ed Hansen, of Ferro Corp., gave an interesting talk on the adherence of porcelain enamels. He explained the different theories prevailing and the substantiating data for each.

midwest group considers drying ovens and electrostatic spraying

AT THE January 23 meeting of the Midwest Enamelers Club in Chicago, C. E. Fitzgerald, of Burdett Manufacturing Co., and Marcel Pouilly, of Illinois Spray & Equipment Co., discussed two subjects of keen interest to porcelain enamelers. Fitzgerald discussed "Dryer and Burner Equipment Design" while Pouilly elaborated on the subject of "Electrostatic Spraying Potential."

Marcel Pouilly, Illinois Spray & Equipment, and C. E. Fitzgerald, Burdett.

To do a fast driving job of porcelain enamel, stated Fitzgerald, it is necessary to heat the work rapidly, drive off the water or moisture uniformly and maintain a uniformly controlled atmosphere to produce a condition suitable for uniform drying of the coating.

He then discussed the merits of various types of dryers, including the radiant heat gas dryer which is said to combine features of both radiant and convection heating. It was stated that the development of the gas-fired radiation heat dryer was a definite step forward in equipment design, and could materially aid the enameling industry.

Pouilly suggested that the enameling industry can profit greatly by learning the functioning and operational characteristics of the electrostatic spray method which has proven very successful in the synthetic coatings industry.

Although there has been experimental spraying done within the last year in the enameling industry, Pouilly mentioned that as far as he knew there is only one successful production operation—at Porcelain Enamel Products, in Rehoboth, Mass., where Veos tile is produced.

However, sufficient data has been developed to encourage the testers that results comparable to those obtained in the synthetic field are attainable once a comprehensive knowledge of material behavior in both the fluid and atomized state is acquired, said Pouilly.

New Supplies and Equipment

C-10. Magnetic positioning tool

New A new holding fixture for production and welding operations consists of three 45-pound pull permanent magnets which have

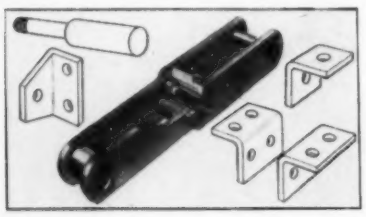
a full 360° adjustment. When positioned, each magnet can be locked in place. The tool will securely hold frames, mitred joints, pipe, even rings in firm welding position at the angle required for the job.

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form, or write to us on your company stationery.

C-12. Conveyor chain suited for automation work

New The versatility of this hollow pin chain makes it ideally suited for construction of automation units. Almost any attach-



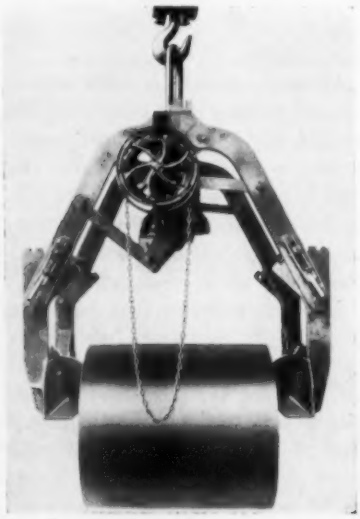
ment the work may require can be added onto the chain. (Note illustration of chain links with holes and attachments for use with the chain.) Extra heavy chain can be furnished.

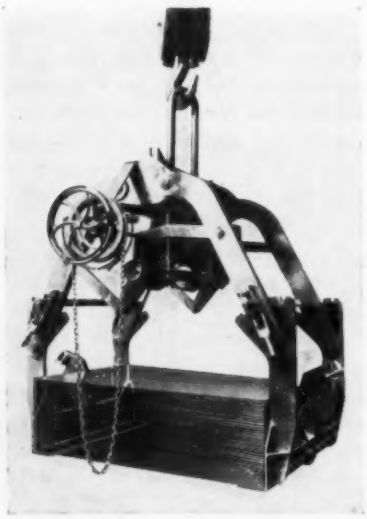
C-11. Dual purpose tool for handling sheet and coil stock

New A new dual purpose materials handling tool — a one man operated sheet and coil lifter —is capable of handling up to 20,000 lbs. of sheet or coiled stock. The new lifter incorporates a hinged coil-bearing segment at the center of each carrying angle.

When loose or bundled sheets are to be handled, the core bearers are swung 90° upward and locked out of the way, leaving the carrying angles clear for lifting sheets.

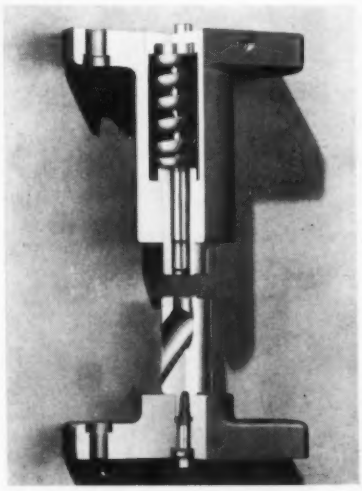
When the lifter is used on coils, the core bearers are swung down into carrying position where they rest on the carrying angle where they have double bearing for extra strength and safety. A wide range of sheet and coil stock may be handled.





C-13. Hole punching units designed for mild steel up to ¼" thick

New This new type hole punching unit is designed to punch mild steel up to ¼" thick, and may be used and re-used in un-



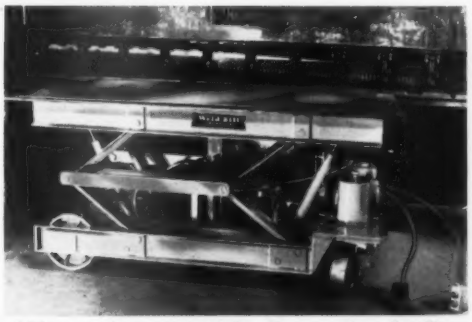
limited setups. Each punch assembly consists of holder, punch, stripping spring, punch guide and pilot head. The die assembly consists of holder, die and pilot pin.

The units provide for punching holes at practically any center-to-center distance over large as well as small sheets of material — the only limiting factor is the size of die set or press.

Punch assemblies and die assemblies are mounted in die sets and operate in a press the same way as conventional dies, permitting unobstructed feeding. The units may be mounted directly to standard flat surface die sets, or on templates which are then mounted into die sets. By using the template mounting method, changing setups of hole punching

units only requires removing from the press the pair of operating templates and replacing them with the next complete setup.

C-14. Hydraulic lift handles dies, sheet steel, machined parts

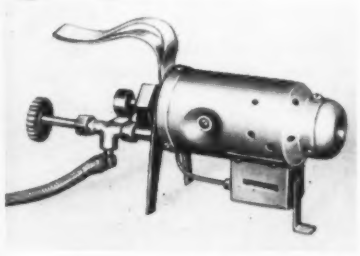


New To handle heavy dies, sheet steel or machined parts, this hydraulic lift table has been developed to accommodate loads up to 5 tons, raising them up to 42 inches. The unit raises its load straight up from 26 inches above floor level.

Ball bearing wheels and casters give the table easy mobility for either manual or shop tractor transport.

The table surface of ¼" steel plate permits easy sliding of heavy parts for manual loading and unloading. Lifting mechanism consists of four cylinders fed from a central hydraulic unit which is operated either electrically or by a foot pump.

C-15. Super-jet blow torch



New A "super-jet" blow torch which operates efficiently at all temperatures, even as low as 70° below zero, pre-heats its own combustion air enabling it to be started in extremely low temperatures at which standard torches cannot be operated. The 75,000 Btu per hour torch is built of stainless steel throughout.

C-16. Shock isolator for presses, brakes, shears, etc.

New New shock and vibration mounts are dual-purpose units, serving to absorb and isolate shocks resulting from the operation of impact-type machines, such as punch presses, brakes and shears, and to isolate vibration and noise produced by high-speed rotating or reciprocating machines. They are designed for use with machines applying static loads of 500 to 4400 pounds to each isolator.

C-17. Plastic metal for dies, drill fixtures, jigs, etc.

New A new plastic metal — a combination of fine steel powder and a special plastic — can be used for making durable and permanent forming and drawing dies, drill fixtures and jigs, holding devices, models, and many other types of industrial equipment.

After the desired shape is formed, the plastic metal becomes a strong, tough and rigid metallic piece in about 2 hours of hardening time. It is said to be non-shrinking, non-expanding, and non-sagging.

C-19. Ultrasonic unit measures thickness of steel sheet

New A new portable ultrasonic instrument measures the thickness of steel sheet where only one furnace is available, and can be used for checking the continuity of bond, and for testing raw stock for laminar defects.

Known as the Reflectogage, the instrument gives visual indications of steel thickness from .014 to .400 on a flat-face, no-paralax cathode ray tube with directly adjacent calibration tape.

C-18. Compact hopper designed for use in crowded areas

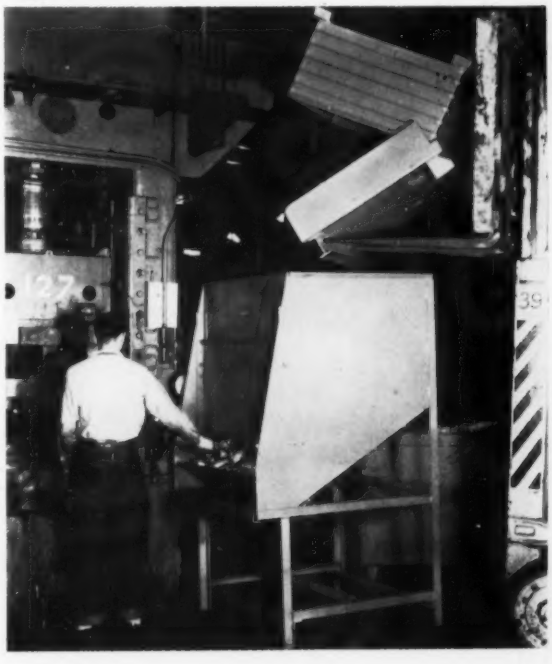
New This new gravity-fed hopper is specially designed to provide vertical mass material supply at the point of use in congested work areas. The portable hopper has a volume of 34.8 cu. ft., yet occupies no more floor space than a conventional industrial container.

In photo on right, press operator picks parts from work-level tray in gravity-fed hopper. At right, fork truck operator drop-bottom dumps more parts into the hopper.

Fork truck idle time is reduced because the hopper can be loaded between shifts or whenever convenient.

When the loaded drop-bottom box is stored under the hopper, total vertical material supply volume at the work stations is increased to 67.4

to Page 62 →



ENDURO *Brightwork*

HELPS KEEP COIN SLOTS BUSY

To sell—*and keep on selling*—beverage dispensers are placed in high traffic locations, often fully exposed to weather.

Still, they should sparkle quality—inspire confidence—to attract thirsty "prospects." Just as important, they must stand up under rough usage.

That's why Mundean Manufacturing Company, Columbus, Ohio, who made this beverage merchandiser, uses ENDURO Stainless Steel for tops and trim. Judging from nationwide performance reports, ENDURO brightwork will help keep the coin slots busy for years to come!

Tough ENDURO *retains* its distinctive luster—resists rust and corrosion—resists abrasions and dents—requires little maintenance. Its hard, smooth surface is easy to clean and keep clean, *always*. Naturally, there's no plating to wear or peel.

Chances are, ENDURO Stainless Steel can *scintillate* the eye-appeal and *buy-appeal* of your products . . . at the same time, increase their wearability—their life span. Why not talk over the possibilities with Republic metallurgists? There's no obligation, of course. Just write.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

the finest stripper of all

is in a NORTHWEST drum

"Step right up Gentlemen, you ain't seen nuttin' yet."

And you haven't until you've seen Northwest's New Liquid Stripper #6 in action.

This high-speed baby really "peels" all organic finishes from steel, magnesium, and zinc die castings in one performance—no two, three, or four run-throughs before the work is ready for re-painting. The closest approach to a universal stripper yet developed.

Liquid Stripper #6 is Safe—no fire hazard, no odor, no fumes, non-toxic.

Liquid Stripper #6 is Sure—parts are fully cleaned—metal surface is unharmed—long life is assured—economy is proven.

Liquid Stripper #6 is Soluble—converts paint film to soluble form which can be rinsed off with a water spray—contains no chemicals which cannot be flushed through sewers.

Call your Northwest Cleaning Specialist about #6 and the other great Northwest Liquid Strippers for aluminum, silicones, and cold stripping.

Remember—YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER.

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

→ *from Page 59*

cu. ft. In-process storage and re-handling can be eliminated through material flow coordination.

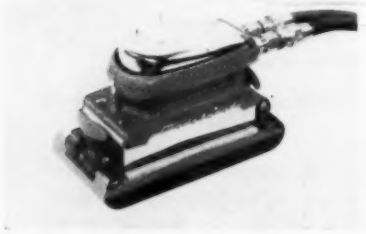
C-20. Specialized porcelain enamel for use in aluminum industry

New A new porcelain enamel for specialized use in the aluminum industry holds promise for other industries, particularly those engaged in chemical, zinc, lead, and magnesium processing.

As a protective coating material, the enamel is designed to extend the life of iron pipes and thermocouple protection tubes used in aluminum and aluminum-alloy baths.

C-21. Orbital-type air sander fits in palm of the hand

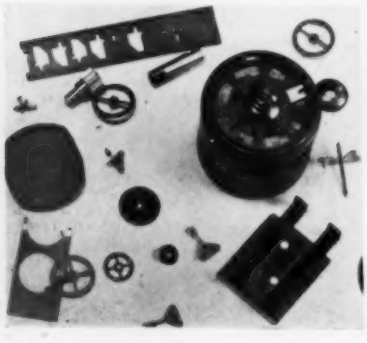
New A new orbital-type air sander has a speed of operation up to 6000 cycles per minute, making it ideal for rough sanding



and preliminary operations prior to finer metal finishing. The 4½-lb. unit fits snugly into the palm of the hand.

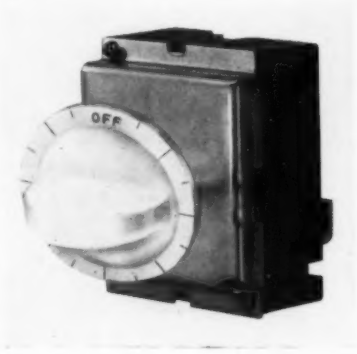
C-22. Honing chip for precision barrel finishing

New Among the advantages of Novaculite — a precision barrel finishing chip — is that chips of this material have unusually long life, will reach hard-to-get-at indentations without wedging or clogging holes, and will not change the work. Photo shows parts of intricate design and delicate construction which have been finished with the new barrel tumbling abrasive product.



C-23. Instant heat, infinite control switch for electric appliances

New When the housewife turns the control knob of her electric range to a desired input, the heating element is immediately boost-



ed to the level selected at 5000 watts. As the surface unit reaches the proper temperature, this "infinite control flasher" switch automatically changes connections and sustains the selected electrical input at 1250 watts on 118 volts. The switch is no larger than single-purpose electric controls.

C-24. Pump-motor for appliances with compact streamlined cabinets

New This close-coupled pump motor unit saves valuable space in appliances where streamlined cabinet proportions are a factor. A

unique pump mount, which fits fractional h.p. motors, bolts directly to the motor housing. Features include: pressures to 150 psi, capacities up to 10 gpm, high suction lift, self-priming, non-foaming, no air entrainment.

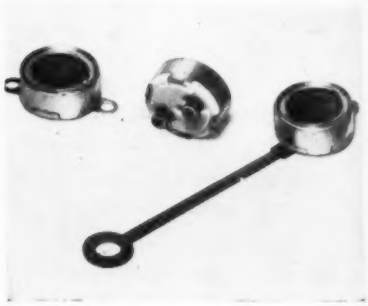
C-25. Self-locking set screw resists vibration

New This improved Zip-Grip self-locking set screw is primarily designed for applications where vibration or close-setting adjustment are factors. The top thread of the screw has been removed so that the locking action is confined to the uniform part of the tapping.

They are being used in washing machines and other appliances, radios and television, pumps, and many other products.

C-26. Quick make-break thermostat

New This compact quick make-and-break thermostat is for close control of temperature in appliance, electronic and industrial appli-



cations. Maximum operating temperature is 400° F.; temperatures as low as −60° C. do not impair normal operation. The unit has a disk type bimetal thermal element.

C-27. Peelable plastic coating for spray booths

New A new type spray booth paint film coat can be used with regular spraying equipment, and has excellent resistance to alkalis, acids, oils, grease, fats, alcohol and gasoline. It sprays on easily and evenly, and dries in about 10 minutes. It is fireproof and flameproof.

C-28. Orlon work clothes find use in electroplating industry

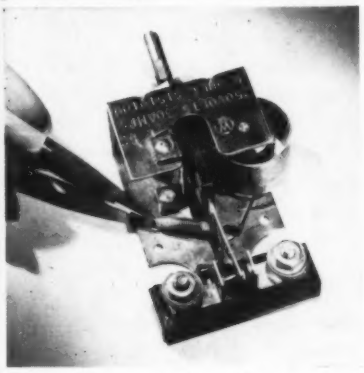
New A major source of concern and expense among firms that do plating has been excessive damage to employees' clothing

through the splashing of acid plating solutions and caustics.

One company has found that work clothes made of Orlon have been in use for more than six months, and are still in excellent condition.

C-29. Heater thermostat handles 30 amps, 125/250 volts without circuit relay or contactor

New This new thermostat can be used to control air blast heaters, unit heaters, radiant heat panels, furnaces or air conditioners.



It can be mounted on the appliance chassis with one or more rivets or screws and has easily accessible terminals for simplified wiring. The new Room-Temp unit can handle currents as high as 30 amps, 125/250 volts, without a circuit relay or contactor.

C-30. All-new hand dispenser for tough tear-resistant tapes

New An all-new hand dispenser is designed for cutting tough, tear-resistant, and hard-to-cut pressure-sensitive tapes. Dispenser

has a fixed saw-tooth cutting edge that permits tape to be cut with simple twist. Unit also features a special ratchet mechanism that permits the roll to move forward as the tape is being used. The new cutting edge has three times the life of trigger-operated razor used on earlier units.

C-31. One-day nameplate etching service

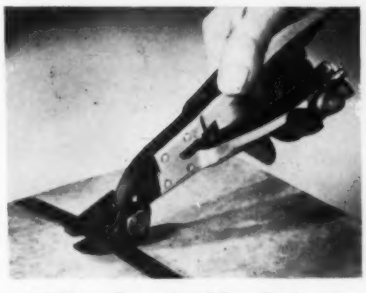
New New photographic and etching methods enables an Eastern manufacturer of nameplates to process an order for any color etched nameplates in runs from one to 100 in one day on an expedited basis.

C-32. "Mar-Not" coating preserves luster of pre-finished metals during fabrication operations

New For those who fear the severity of their manufacturing operations denies them the conomy and appearance advantages of using Nickeloid pre-finished metals, a special "Mar-Not" protective covering preserves the lustrous finish of these pre-finished metals during drawing and forming operations, then "peels off like a banana skin." It is pointed out that draws and bends that were formerly impossible are now being done satisfactorily with metals protected by the "Mar-Not" coating.

C-34. Light-weight strap cutter

New This new strap cutter, weighing less than a pound and balanced to fit the hand, will cut strapping up to and including 3/4"



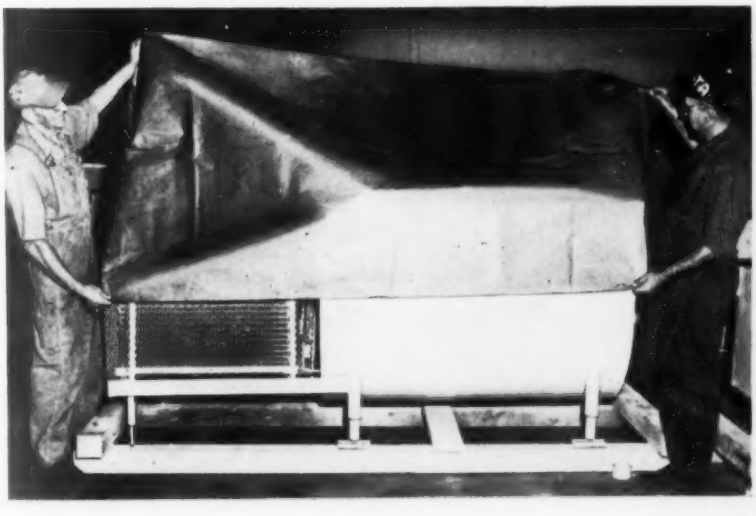
x .035" easily and safely. Spring tension holds the blades apart for ready use. Cutting blades can easily be resharpened.

C-35. Box stitcher for all types of corrugated, solid fibre boxes

New A new box stitcher is available in five different types — the post, arm, combination post and arm, side seam, and top. This complete line makes it possible for all types of corrugated and solid fibre boxes to be stitched quickly and securely at low cost. Stitcher can handle work thicknesses from 1/16" to 3/4".

C-33. Re-usable paper bags protect finish of large products

New A bag is usually less expensive than wrapping paper when it reduces labor. This was demonstrated recently when The Creamery Package Mfg. Co. began using specially-treated paper bags to cover bulk farm cooling tanks. Previously, it took two men about 15 minutes to wrap the unit in plain wrapping paper. Now it takes only a minute to slip the fitted bag over the tank. Bags are re-usable.



New Industrial Literature

301. Standard solenoid bulletin

New For those who wish to avoid special tooling and inventory costs in connection with solenoids, standard units are now available. The standard solenoids provide basic models with 12 sets of characteristics, adequate for a broad range of applications. Bulletin contains power curves, drawings and technical data.

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302. Brochure on single-stage phosphatizing process

New Econocote, which can be used in a single-stage spray washer for both cleaning and phosphatizing, creates an iron phosphate coating of between 25 to 40 mgs per sq. ft. Brochure describes how it can be used for treating steel, cast iron, aluminum or zinc. An important feature is that no rinse is required.

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303. Abrasive consumption chart in metallic abrasives catalog

New This new 16-page, two-color illustrated catalog contains detailed descriptive material on a line of metallic abrasives, and tells how to select the proper abrasive. It explains the shot peening and abrasive impact cleaning processes. An abrasive consumption chart lists various abrasives and gives their consumption rate in pounds per wheel hour.

304. Booklet illustrates many uses in appliances for pre-plated trim

New This 24-page, two-color booklet includes fabrication techniques, uses and properties of pre-plated finishes. The booklet illustrates scores of successful applications in the electrical appliance, stove heater, lighting, housewares and display industries, among others. The scope of uses runs the gamut from stove pipes to rotisseries.

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305. Standard press brakes

New A new specification sheet describes two standard press brake models available for immediate delivery from stock. Prices are included. Rated at 25 tons capacity, the larger brake will bend 78 inches of 16 ga. mild steel over a ½-inch die opening. The smaller brake has a capacity of 15 tons, and will bend 48 inches of 16 ga. mild steel over a ½-inch die opening.

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306. Porcelain enamel signs for machinery, equipment, etc.

New Porcelain enamel identification signs for machinery, equipment, etc. are described in this new bulletin. It points out that these signs are permanently unaffected by dirt, grease, heat, and are said to be strong and durable under all kinds of working conditions.

307. Brochure of nameplates made of .003 foil

New A new type of metal nameplates, made of .003 foil, are easily fastened to curved and flat surfaces without the need of drilling holes. They permanently adhere to such surfaces as metal, porcelain, glass, wood, plastic. Brochure is entitled "A Revolution in Nameplates."

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308. Electro-pneumatic clutch for open back inclinable presses

New A new 20-page bulletin contains specifications on a new development in the metal working-industry — open back inclinable presses equipped with electro-pneumatic clutch. Electrically controlled and air actuated, this clutch combines the prime advantages of both friction and mechanical sleeve clutches.

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309. List of metal protective, paint bonding chemicals, processes

New This multi-colored check list gives complete specifications, methods of aplications, processing data, and uses for a complete line of ACP metal protective and paint bonding chemicals and processes.

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310. Application of "optically clear" rigid plastic sheets

New This 12-page catalog describes and illustrates applications of cast thermoset "Concor" sheets, which has such properties as high abrasion and heat resistance, toughness and complete solvent resistance. Fabrication data is included.

One illustration shows an electric range timer with a curved plastic window bent to a 12-inch radius. Other applications of the "optically clear" plastic is shown, and include such products as room coolers, vending machines, business machines, laundry appliances, etc.

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311. Felt product applications

New Included in this catalog are illustrations and material on wool felt wheels, bobs and sheets, and hair felt sheets and wheels. In addition, there are tables on felt wheel selection and specifications.

FINISH
360 N. Michigan Ave.
Chicago 1, Illinois

Please forward to me at once information on the new supplies and equipment and new industrial literature as enumerated below:

No._____ No._____ No._____ No._____

No._____ No._____ No._____ No._____

No._____ No._____ No._____ No._____

Name _____ Title _____

Company _____

Company Address _____

City _____ Zone____ State _____

A plant for applying vitreous enamel to aluminum

(Continued from Page 40)

ucts completely automatic equipment can be provided through all the various processes from cleaning to finished product. The design and layout of this equipment is dependent on the ware being processed.

One other very important part of a plant for applying vitreous enamel on aluminum is the provision of a clean and dust free working area. In a large plant, it may be necessary to provide filtered make-up air or pressurized spray booths in order to provide the necessary degree of cleanliness.

In view of the nature of the enamel itself, adequate facilities for the employees to wash must be provided. The safety precautions published by the frit manufacturers include:

1. Avoid dust inhalation.
2. Provide proper clothing such as smocks or coveralls for the operators.
3. Require workers to wash thoroughly before eating; permit no food to be brought into the working area.
4. Perform regular medical examinations of all operators for plumbism. Stipple counts and/or other tests considered advisable by the physician should be made at least every 3 months.

The sketch shows suggested layout for a semi-automatic plant for enameling 20 foot long x 1 foot wide architectural panels wherein the pickle room operations would be manual as would the transferring of the loaded firing racks. The ware would be automatically unloaded, sprayed and reloaded on the racks. After being manually spotted the racks would be automatically cycled through the furnace. Such a plant would require approximately 15,000 sq. ft. of floor space and have a production of about 9,000 sq. ft. of finished panels per shift. This is based on four fires per piece of finished ware.

With the further development of frits which will come with greater usage, so too will come improved techniques in metal preparation, enamel application, firing and automation of the plant.

Faster fusion

→ *from Page 35*

engines. These run the gamut of special alloys such as Inconel, Inconel X and W, Stellite 25, N-155 Discalloy and the stainless steels. In jet engine work, an added requirement is made. The dimensions of the weld are specified and tolerances in width must be closely controlled.

In addition to the high temperature alloys, many aluminum alloys are welded by this method. Typical example of this work is the welding of huge fuel tank rings, 4 feet in diameter. These rings serve as splice joints for the largest external fuel tanks ever built for aircraft. They are fabricated from 61S aluminum alloy. They are welded with high frequency stabilized a.c. current, using between 75 and 150 amperes, depending upon thicknesses encountered. These gauges vary from .050″ to .072″. The torches used are exactly the same as those employed in welding stainless steels.

Spot welding in precision fixtures

One of the interesting types of welding which this method is fitted to accomplish is fusion spot welding. With a special pistol-type torch, it can be used to make automatically-timed spotwelds which are exceptionally useful in certain production jobs. Because the spotwelds can be accomplished from only one side of the structure, the parts do not need to be removed from jigs but can be spotwelded right in their fixtures. The technique is valuable where several components must be aligned in a precision fixture and spotwelded in place.

Our company has constructed a mobile machine which incorporates all of the necessary elements for this type of spotwelding — d.c. generator, argon gas supply, 40-gallon water tank and pump. With this device, spotwelding facility can be quickly moved along the production lines to the work. We are using the new machine to spotweld Fairchild C-119B exhaust hoods and machined rings in assembly jigs. After these parts are carefully fitted together and spotwelded, they are seam welded in resistance welding machines. The torch produces such a smooth spotweld that no finishing is necessary in order to run these parts between the wheel electrodes of the resistance welders.

In addition to the large amounts of manual welding performed, substantial quantities of automatic operations are accomplished. Automatic machines are used on all straight line, butt welding jobs, both in aluminum alloys and the stainless steels. For instance, after-burners, tail-pipes and exhaust cones for General Electric J-47 jet engines are built in this way. These structures are fabricated from stainless steels and other high temperature alloys in thicknesses from .040″ to .075″. Special fixtures are used to hold the parts in exact alignment while the automatic welding head traverses their longitudinal or circumferential seams. Here, d.c. straight polarity current is used and welding speeds up to 30 inches per minute are attained. A number of machines are equipped with selenium-type rectifiers which convert a.c. current from the line into d.c. and eliminate the motor generator.

All of the longitudinal seams in huge fuel tanks are welded with automatic machines. These large sections are butt-welded with filler wire automatically fed into the seam. The alloy is 61S aluminum and gauge thicknessess run from .051″ to .072″. With a "floating" head which automatically maintains a constant length arc, it is possible to weld contoured surfaces. Such a machine has been built to weld the irregular contours of after-burner nozzles, automatically.

Semi-automatic welding for irregular components

One of the newest devices, which we are using, is a semi-automatic welder which is a manually operated torch which automatically feeds filler wire into the arc. All the operator

It's the...

that counts...

Plant Tested GROUND COATS are the answer

Call it what you want . . . adherence . . . bond . . . grip. Our experience, as one of the largest job enameling plants in the country, has proved to us that unless you have *"GRIP"* in ground coats . . . then . . . you will have a high reject figure.

Experience is a great teacher

Because we produce FRITS for both our own use . . . and for our Frit customers . . . we have learned through long practical experience that we must have that *"GRIP"* or else both we and our Frit customers will have too many rejects.

ING-RICH FRIT
"The Plant Tested Frit"

Cash in on our EXPERIENCE!

Cut your rejects with ING-RICH GROUND COATS. Remember . . . *plant tested* experience is the answer.

INGRAM-RICHARDSON, INC. OFFICES, LABORATORY & PLANT • FRANKFORT, INDIANA

has to do is set the current and wire feed, and guide the work. When the arc is struck, the wire is automatically fed between rolls into the weld. Its movement propels the torch. Hand welding speeds as high as 80 inches per minute have been reached with this new method. Combining the advantages of manual guidance with automatic control of arc length, wire feed and travel, the technique is excellent for irregular components. It is water-cooled and capable of handling up to 300 amperes capacity.

We use a great deal more argon gas than helium in connection with Heliarc welding. Basically, this is because argon can be obtained in higher purity commercially and is more efficient for most of these welding tasks. Ten times heavier than helium, argon flows down over the welding better, and much less is required to perform a similar welding assignment. Argon arcs have lower voltages than helium arcs, and thus permit the use of higher currents without burning the work. Both lower voltage and increased current contribute to improved arc stability. The company does use helium, mixed with argon, for all welding of aluminum alloys because the heat of the helium arc is greater for a given current than that of argon, and penetration is deeper.

Phosphatizing . . .

→ *from Page 46*

heavy phosphate coatings produced did not lend themselves to painting. Therefore, their use was almost limited to small steel articles, which were finished with an oil or wax coating.

After World War I, the paint industry rapidly succeeded in replacing the natural oleoresins with the more dependable synthetic resins. These synthetic paints, varnishes, and lacquers could be cured rapidly by polymerization or condensation at room temperature or more frequently at elevated temperatures. These new finishes were excellently suited for conveyorized systems. Instead of multiple coats with long drying times between each coat, which the old oil paints afforded, the new materials were applied as two coat systems and frequently as a one coat system. The organic film was much thinner than the one obtained with the old oleoresins. Durability, appearance, and brilliance of these finishes were vastly superior. However, in using the synthetic finishes, proper metal preparation was even more mandatory to eliminate blistering, underrusting, peeling, etc.

Needed improvements for expanded use

It is quite evident thtat phosphatizing could only obtain a permanent place in the metal finishing field if improvements could be made, particularly in two directions:

1. Decreasing the treatment time.
2. Producing fine crystalline and thin coatings.

The first successful attempt toward this target was the incorporation of small amounts of copper salts in the phosphate bath. This shortened the

processing time to about 10-15 minutes and resulted in finer and thinner coatings, suitable for synthetic organic finishes. However, inclusions of metallic copper in the phosphate coating set up a galvanic cell, iron-copper, causing accelerated rusting of these coatings. The permanent answer to the requirement of producing fine crystalline phosphate coatings in a short time was the introduction of oxidants in the phosphatizing technique in the early 1930's. Who first suggested the use of oxidants cannot be traced to any particular individual or company, since oxidants have been mentioned in numerous patents. The most well known patent, U. S. Patent 1,911,726, recommending the use of oxidants was granted, in 1933, to The Parker Rust Proof Company.

The oxidant serves two purposes:

1. It depolarizes the hydrogen and, therefore, removes the hydrogen blanket from the metal surface. Consequently it shortens the processing time to a few minutes (3-7 minutes).
2. It oxidizes the soluble ferrous iron which is precipitated as insoluble ferric phosphate and, therefore, stabilizes the phosphate bath.

Depending upon type and amount of oxidant, the crystal structure and thickness of the coating can be varied widely. The most well known oxidants are nitrates, nitrites, chlorates and mixtures of them. The most widely used bath is the zinc-phosphate type bath.

The introduction of the oxidants in the phosphatizing technique permitted the use of phosphatizing in conveyorized and automatic line finishing operations. It contributed decidedly to the widespread application of phosphate coatings prior to painting. A few years later, spray phosphatizing was first adopted by the automobile industry, which shortened again the processing time (30-60 seconds). It is natural that this type of application is particularly suited for mass production requirements. It is impossible, in the frame of this presentation, to mention all improvements and developments during the history of 50 years of industrial phosphatizing. Therefore, the following improvements are highlighted:

Phosphatizing of zinc and its alloys and aluminum and its alloys was perfected. Continuous coating of strip steel appears to be possible.

Trends in phosphate coatings

In recent years iron phosphate coatings replaced zinc phosphate coatings for numerous applications. The iron phosphate coating can be produced with acid alkali or ammonium phosphate solutions. The coating is almost amorphous and renders an excellent base for organic finishes. The bath is economical and very easy to control. If proper surfectants are incorporated this type of bath cleans and coats simultaneously; an application which is widely accepted by the metal fabricating industry.

The practical perfection of phosphatizing was accompanied by a thorough theoretical study of the

to Page 82 →

The Westinghouse ***refrigerator***

has come a long way

since 1932

...and so has Du Pont DULUX® enamel!

THE EFFICIENCY and smart good looks of the 1932 Westinghouse refrigerator made it one of the most welcomed home appliances of its time. But over the years, constant improvement by Westinghouse technicians has resulted in a refrigerator that gives the modern housewife far more convenience and leisure than the shopper of twenty-two years ago could ever hope for! The popularity of the 1954 Westinghouse is proof that continued product improvement is vital in maintaining the acceptance of the buying public.

And so it is with America's leading home appliance finish—Du Pont "DULUX" enamel! Constant research over the years by Du Pont chemists has resulted in more rugged resistance to chipping, cracking, scratching or staining . . . easier cleanability . . . longer-lasting whiteness than ever before. That's why the "DULUX" of today meets the most exacting requirements of *today's* topflight appliance manufacturers.

E. I. du Pont de Nemours & Co. (Inc.), Finishes Div., Wilmington 98, Del.

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"DULUX" ENAMEL

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

America's leading home appliance finish

. . . has helped sell over 36,000,000 refrigerators!

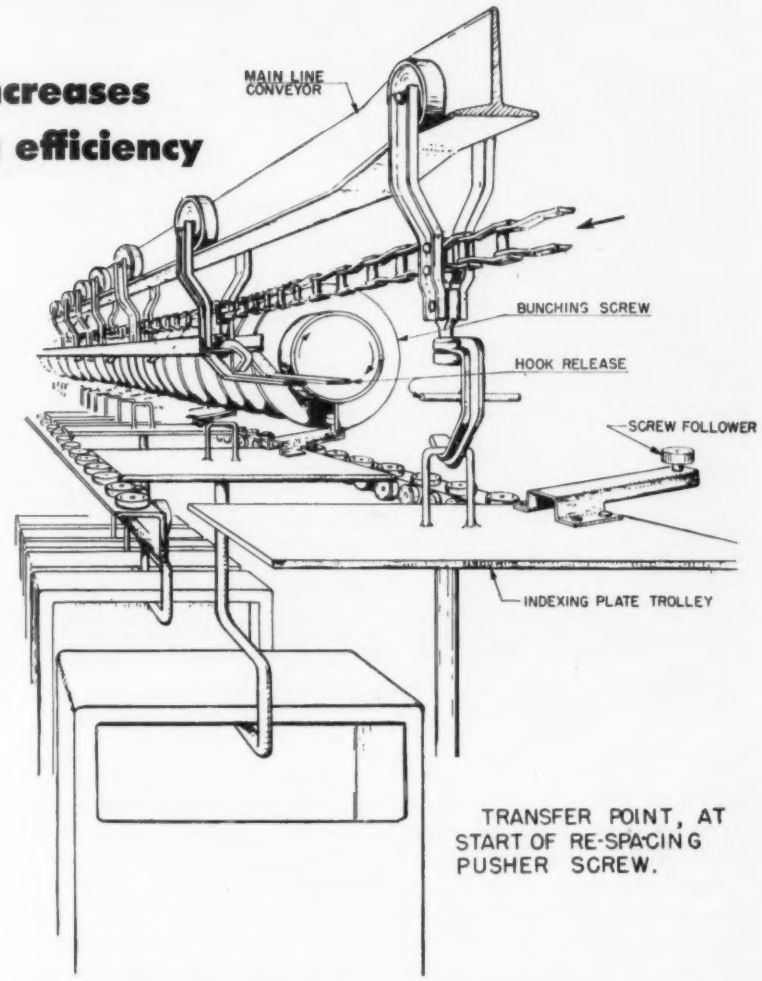
finish SUGGESTION BOX

A set-up arranged for painting refrigerator cabinets electrostatically. Note the cabinets are carried upside-down so that the tops can be painted by bottom spray head.

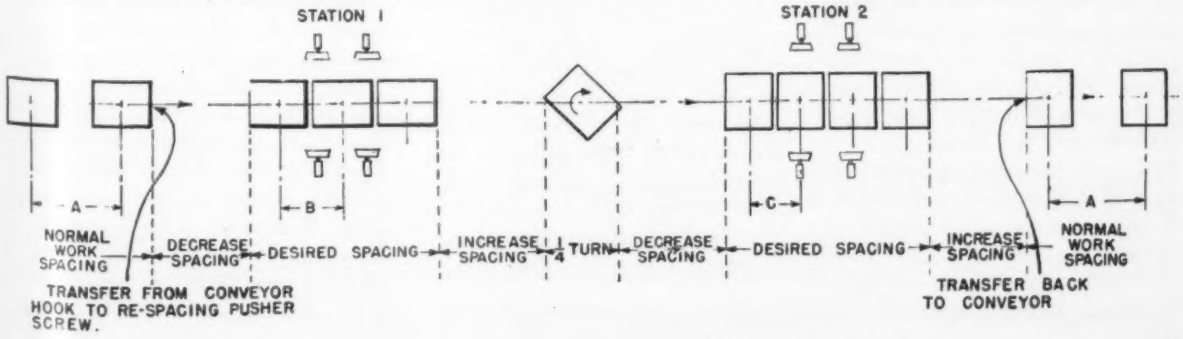
Grouping conveyor increases finishing efficiency

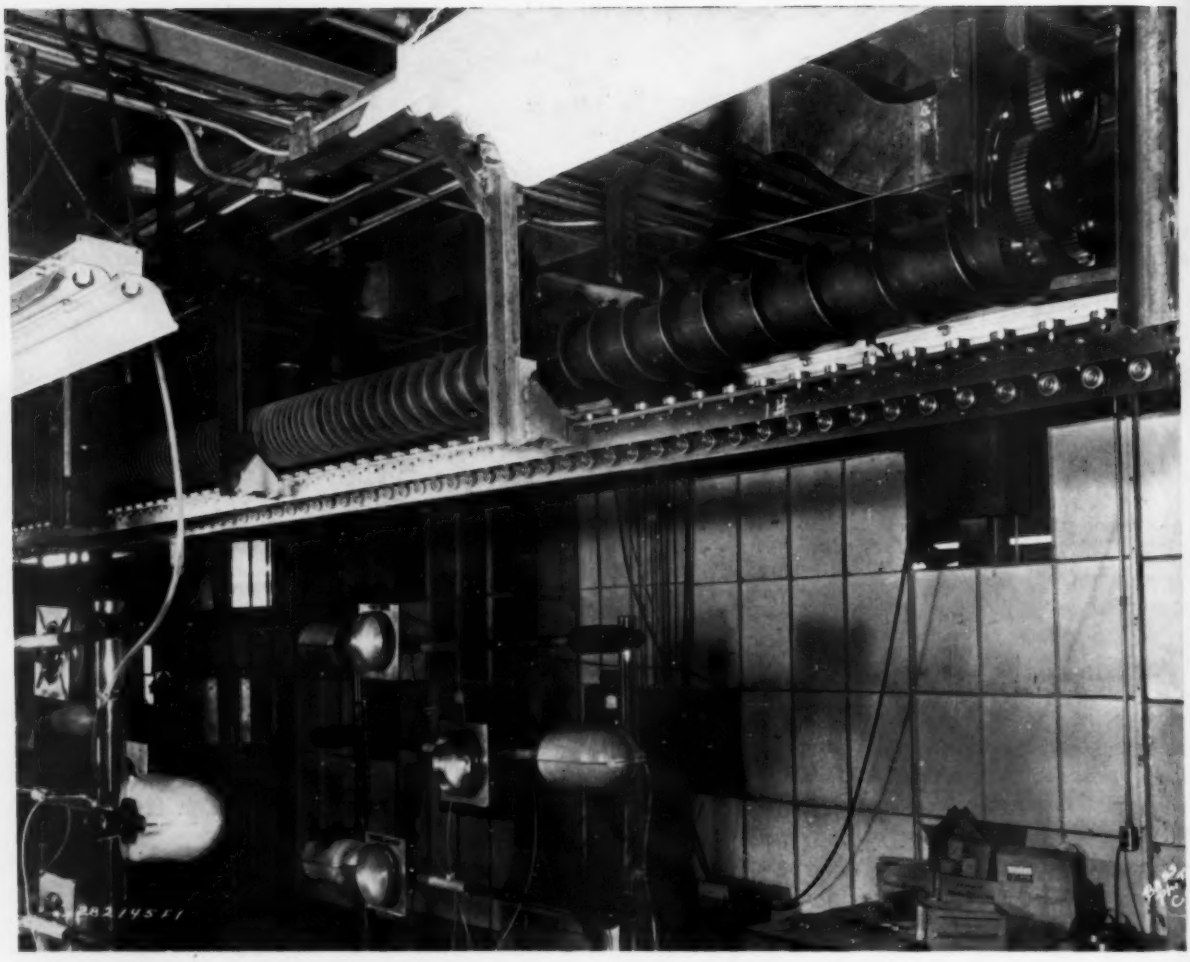
AN auxiliary mechanism for existing finishing line conveyors is coming into use in the appliance and metal products manufacturing field. Designed originally for use with the electrostatic spray process, the mechanism automatically changes normal work centers to permit the uniform coating of large square and rectangular articles such as refrigerators, file cabinets, space heaters, automatic washers and dryers, etc. at greatly increased efficiencies.

Ordinarily, articles of this type are carried on conveyors at a uniformly wide spacing to facilitate certain manufacturing operations, and to permit turning corners and moving up and down inclines without interference. For painting purposes, however, it is desirable to bring the articles as close together as possible so that an essentially continuous surface is presented for the coating operation. In order to intimately group and re-separate the articles without the pos-



Opposite sides of the article are painted in the grouped position at Station 1. The parts are then separated, turned a quarter-turn and re-grouped to a new spacing for coating the other pair of side faces at Station 2. The articles are separated again and automatically transferred back to the main conveyor at the original spacing.





In this photograph can be seen the principal components of the grouping conveyor with an electrostatic spray station at the lower left.

sibility of contact between freshly coated surfaces, smooth and gradual speed transition zones are required.

Engineers have produced an ideal solution to this problem. The grouping conveyor is a "package" unit, adaptable to any standard overhead or spindle conveyor. It provides for positively controlled transitions between normal and intimately grouped spacings, together with automatic transfer from and to the main conveyor. By means of simple gear changes, the grouping conveyor can be adapted quickly to a wide range of article sizes and shapes.

Figures on preceding page illustrate one form of application. In operation of the unit, the workholder is automatically transferred from the main conveyor to a supporting structure, consisting of roller equipped rails positioned just below the main conveyor. A plate, integral with the workholder, is carried on and accurately guided by the rollers.

A cam follower on the plate engages a special rotating screw which propels the plate along the rollers. A varying pitch at the ends of the screw provides the desired smooth speed changes.

Source for further information on grouping conveyors may be obtained by writing to *finish* reader's service.

FIVE NEW GAMA MEMBERS

Five new members have joined the Gas Appliance Manufacturers Association. They are: Control Engineering Corp., Norwood, Mass.; United States Stove Co., South Pittsburgh, Tenn.; General Manufacturing and Distributing Co., Quincy, Mich.; Waterfilm Boilers, Inc., Jersey City, N. J.; and Pittsburgh Water Heater Co. of California, San Francisco.

Delegates and alternates to GAMA, as reported by the companies, include: G. B. Foote, vice president and treasurer, and Glenn E. Andrews, chief engineer, Control Engineering; S. L. Rogers, Jr., secretary-treasurer, and J. L. Raulston, vice president, U.S. Stove; J. L. Wibel and F. G. Adams, partners, General Mfg.; Kenwood A. Hanson, general sales manager, Waterfilm; and Charles F. Woodmansee, owner, and Harry Higdon, sales manager, Pittsburgh Water Heater.

NEW PROTECTIVE COATING CHEMICAL FOR ALUMINUM

ALODIZING

Alodizing with "Alodine,"* a new technique in the protective coating of aluminum, was made available for production-scale use in 1946. Since that time Alodizing has largely supplanted the more elaborate, costly and time-consuming anodic treatments in the aircraft and other industries.

Continuous and successful industrial use has clearly demonstrated the simplicity and economy of the Alodizing process as well as the effectiveness of the "Alodine" amorphous coatings, particularly as a base for paint. In fact, the paint-bond that Alodized aluminum provides has been found to be superior to that possible with chromic acid anodizing.

The corrosion-resistance of unpainted aluminum Alodized with "Alodine" Nos. 100 or 300 is excellent, easily meeting the requirements of Specification MIL-C-5541. However, a need for protection of unpainted aluminum, even better than that obtained with chromic acid anodizing, has long been recognized.

NEW IMPROVED "ALODINE" DEVELOPED By ACP RESEARCH CHEMISTS

Several years of intensive research have now led to a new type of "Alodine," designated as "Alodine" No. 1200. This new protective coating chemical forms an amorphous mixed metallic oxide coating of low dielectric resistance that provides unusually high corrosion-resistance for unpainted aluminum. In addition, it forms an excellent paint bond that approaches closely the high quality obtained with the earlier types of "Alodine."

After having been tested for conformance with Specification MIL-C-5541, "Alodine" No. 1200 is now about to go into production.

PROCESS DETAILS

"Alodine" No. 1200 is the only essential chemical needed to prepare the coating bath and the final rinse bath. One of its unique features is that it can be used in tanks in an immersion process, or, in a multi-stage power washer in a spray process, or, with a slight adjustment of pH, with brush or portable spray equipment in a manual process. This means that even where the simple production equipment is not available, or where touching up of damaged coatings previously Alodized or anodized is required, excellent protection and paint bonding can still be obtained with practically no equipment.

All three methods of application easily meet the requirements of Specification MIL-C-5541.

Process sequence for all three methods of application is the same as for other standard grades of "Alodine" such as Nos. 100, 300, and 600, viz.: 1. Pre-cleaning. 2. Rinsing. 3. Alodizing. 4. Rinsing. 5. Acidulated rinsing. 6. Drying.

Coating time in an immersion process ranges from 2 to 8 minutes and in a mechanized spray process is about 30 seconds. "Alodine" No. 1200 baths are operated at room temperatures (70° to 100°F.) and heating is required only if the bath has gotten cold after a "down" period.

RECOMMENDED USES FOR "ALODINE" No. 1200

"Alodine" No. 1200 is specifically recommended for coating wrought products that are not to be painted or are to be only partially painted; and for coating casting and forging alloys whether or not these are to be painted. "Alodine" Nos. 100 and 300 are still recommended for coating wrought products such as venetian blind slats, awnings, etc., that are invariably painted.

RESULTS OF TENSILE TESTS

This new "Alodine" not only retards visible corrosion and pitting, but as shown in the table below, the loss of ductility with "Alodine" No. 1200, both brush and dip, after 1000 hours salt spray was less than for chromic acid anodizing after 250 hours, and for "Alodine" No. 100 and a conventional chromate treatment after 168 hours exposure.

PROCESS	SALT SPRAY EXPOSURE	COMPLIANCE WITH TENSILE REQUIREMENTS OF MIL-C-5541
CHROMIC ACID ANODIZING	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	fails
	1000 hrs.	fails
BRUSH "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 1200	168 hrs.	passes
	250 hrs.	passes
	500 hrs.	passes
	1000 hrs.	passes
DIP "ALODINE" No. 100	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails
CONVENTIONAL CHROMATE TREATMENT	168 hrs.	passes
	250 hrs.	fails
	500 hrs.	fails
	1000 hrs.	fails

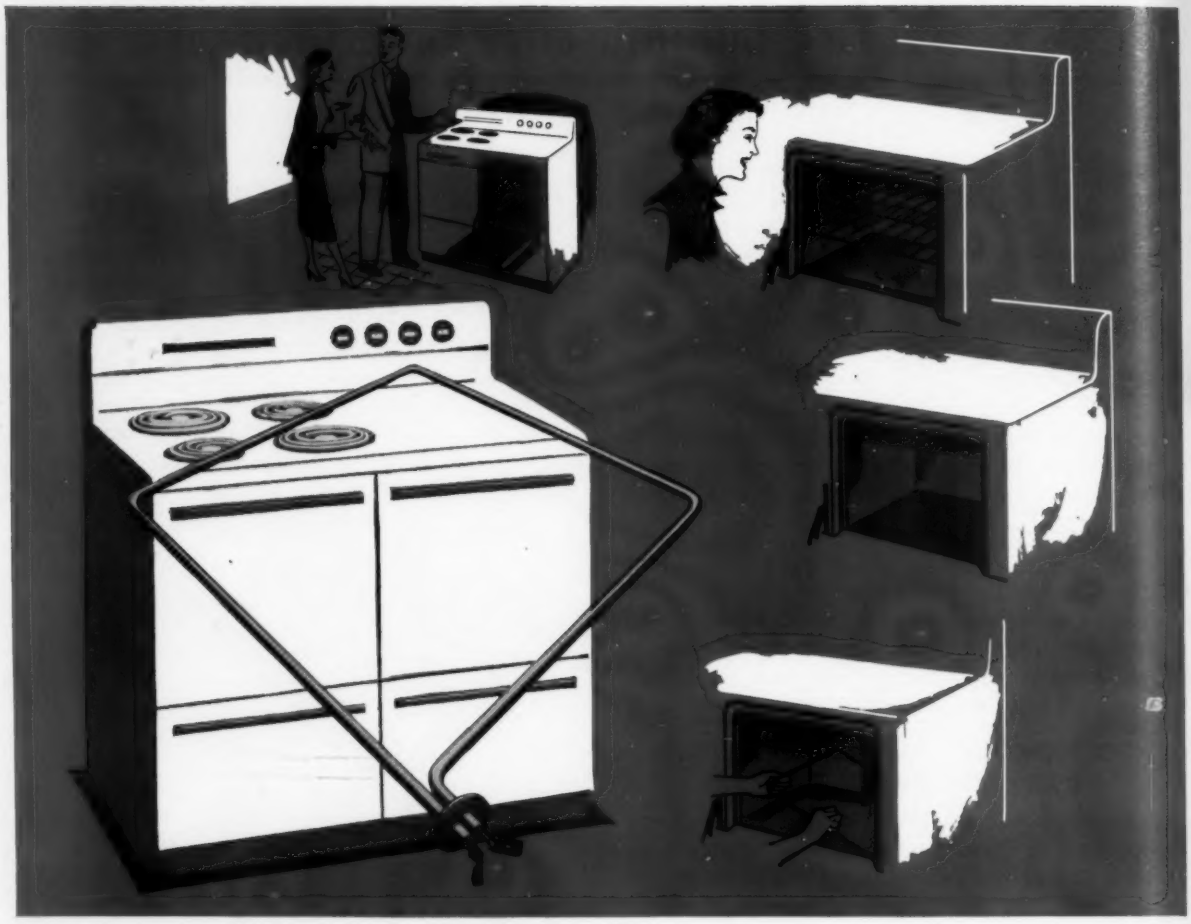
*"Alodine" Trade Mark Reg. U. S. Pat. Off.

CHEMICALS ACP PROCESSES

AMERICAN CHEMICAL PAINT COMPANY

General Offices: Ambler, Penna.

Detroit, Michigan **Niles, California** **Windsor, Ontario**



this new SELLING feature can save you money

with TK® Rod-type Oven Units

Here's a new sales feature your dealers (and their customers) will *love*. Better yet, it can save *you* money! For when you switch to TK's new rod-type oven unit you can eliminate baffles in your oven construction. TK's new unit does a superlative cooking job with or *without* baffles.

Easier Cleaning—Hinged at one corner, these units are easily swung up and away from the oven base for fast, easy cleaning. They are also available with bayonet-type connections for standard oven installation. The sealed, rod-type construction makes these new units immune to spilled foods, rust or corrosion . . . an important feature range buyers will like.

Another development in "SIMPLIFIED COOKING"
Used with *Monotube*® Surface Units, TK Rod-type Oven-Elements give you a powerful selling story to women. *"Simplified Cooking"* carries real appeal. Why not ride with this winner?

TK FERRO

FERROD MFG. COMPANY

A Subsidiary of Ferro Corporation

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DRAKE TO DIRECT MARKET RESEARCH FOR BORG-WARNER

Establishment of a market research department of Borg-Warner Corp. has been announced by Roy C. Ingersoll, president.

The new department, whose activities are to supplement and augment the market research operations of the firm's various divisions, will be headed by John A. Drake as director of market research. Drake has been with Norge for 23 years, most recently as director of marketing.

G-E NAMES BIXBY SALES MGR. FOR CLOTHES DRYERS

Appointment of Carl L. Bixby, Jr. as sales manager for automatic clothes dryers was announced by E. M. Haines, marketing manager, home laundry equipment department, General Electric Co., Louisville.

TEMCO NAMES BAUMAN, STOKES, DOUGLAS TO MFG. DIV. POSTS

Temco, Inc., Nashville, has announced several changes in its manufacturing division which are designed to further streamline its modern production facilities and methods.

C. F. Bauman, formerly manufacturing superintendent, was named director of manufacturing with immediate supervision of the overall production program. Richard Douglas, formerly production manager, was appointed director of purchasing. Cecil G. Stokes has joined Temco as director of production engineering.

DULANE'S DUSEK NAMED VICE PRESIDENT OF NESCO

Robert Dusek has been named a vice president of Nesco, Inc., in addition to his present position as vice president of Dulane, Inc., of River Grove, Ill.

Dusek was formerly president of Dulane, manufacturers of electric deep fat fryers, which was acquired recently by Nesco.

PHILCO NAMES OTTER, RICH AND HARDY TO NEW POSTS

Appointment of Larry F. Hardy as vice president in charge of product development, John M. Otter as vice president in charge of consumer product divisions, and Raymond A. Rich as vice president and general manager of the refrigeration division, Philco Corp., Philadelphia, was announced by William Balderston, president.

Hardy has been president of the television and radio division since 1949. Otter was vice president and general manager of the refrigeration division since early in 1952. Rich was vice president of the refrigeration division for the past three years, supervising development of Philco's expanding line of major appliances.

NATL. PRESTO TO TRANSFER CIVILIAN PRODUCTION TO SOUTH

National Presto Industries, Inc., Eau Claire, Wis., is planning to transfer its entire civilian production to Jackson, Miss., this spring, Lewis E. Phillips, president, stated at the firm's annual stockholders' meeting.

The company manufactures small appliances, including pressure cookers and canners, steam irons, electric deep fryers, and coffeemakers. The firm also had defense contracts totalling $30,000,000. Presto's two plants in Eau Claire will operate entirely on defense work following the civilian production move.

WESTINGHOUSE UPS STEPHENSON TO MANAGER OF REFRIGERATION

The appointment of S. J. Stephenson as manager of household refrigeration, electric appliance division, Westinghouse Electric Corp., has been announced by R. J. Sargent, manager of major appliances. Formerly merchandise manager of household refrigeration, Stephenson succeeds George H. Meilinger, who has been named sales manager of major appliances.

MAGIC CHEF NAMES FLOERKE "MAGIC-AIRE" SALES MGR.

Magic Chef, Inc., St. Louis, has entered the central heating and air conditioning field with 23 all-new "Magic-aire" units and a complete specialty sales organization. H. V. Floerke, former sales service manager, has been named central heating

sales manager with full responsibility for "home conditioning" operations.

All central units will carry the company's recently acquired "Magic-aire" trademark which is also featured on the firm's current line of space heaters.

RUUD TO MOVE OFFICES TO KALAMAZOO PLANT

Ruud Manufacturing Co., Pittsburgh, will move its main headquarters later this year to Kalamazoo, Mich., where a new office building will be erected near the Kalamazoo plant.

FLORENCE STOVE APPOINTS GENGER MANAGEMENT ENGINEER

Victor K. Genger has been appointed management engineer for Florence Stove Company, according to J. P. Wright, vice president. His headquarters will be in Chicago.

Formerly vice president of the management engineering firm of McClure, Hadden & Ortman, Inc., Chicago, Genger has had extensive experience in his field, and is author of the "Handbook on Standard Time Data for Machine Shops."

PRESSED METAL INSTITUTE NAMES MORRISON VICE PRES.

The board of directors of the Pressed Metal Institute has elected

Sam Morrison, president of Morrison Steel Products, Inc., Buffalo, N.Y., as second vice president of the Institute.

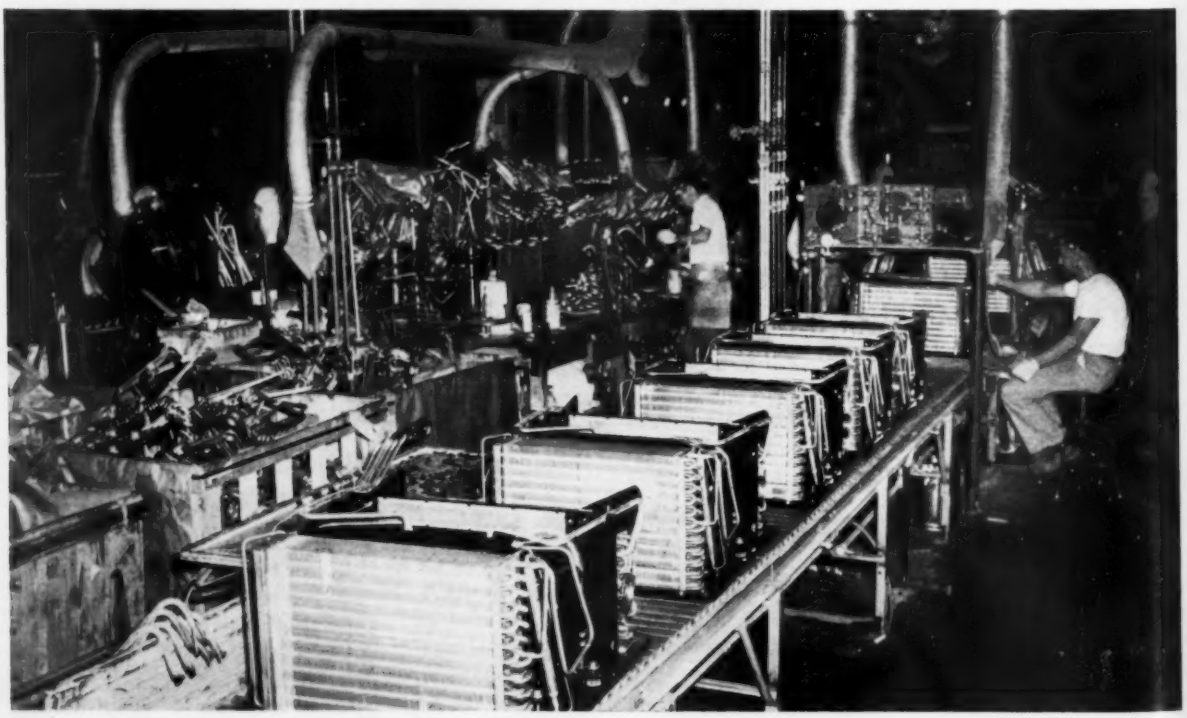
It was stated that the election of Morrison was based on the feeling of the membership that it would strengthen PMI's operations as well as establish a succession line to the presidency and increase the experience of the president at the time he takes office.

Morrison has been very active in Institute affairs, for the last decade having served as chairman of the Western New York District, a member of the PMI board of directors and executive committee, as well as having been an active committee member.

STRATHEARN TO DIRECT AVCO HOME LAUNDRY RESEARCH

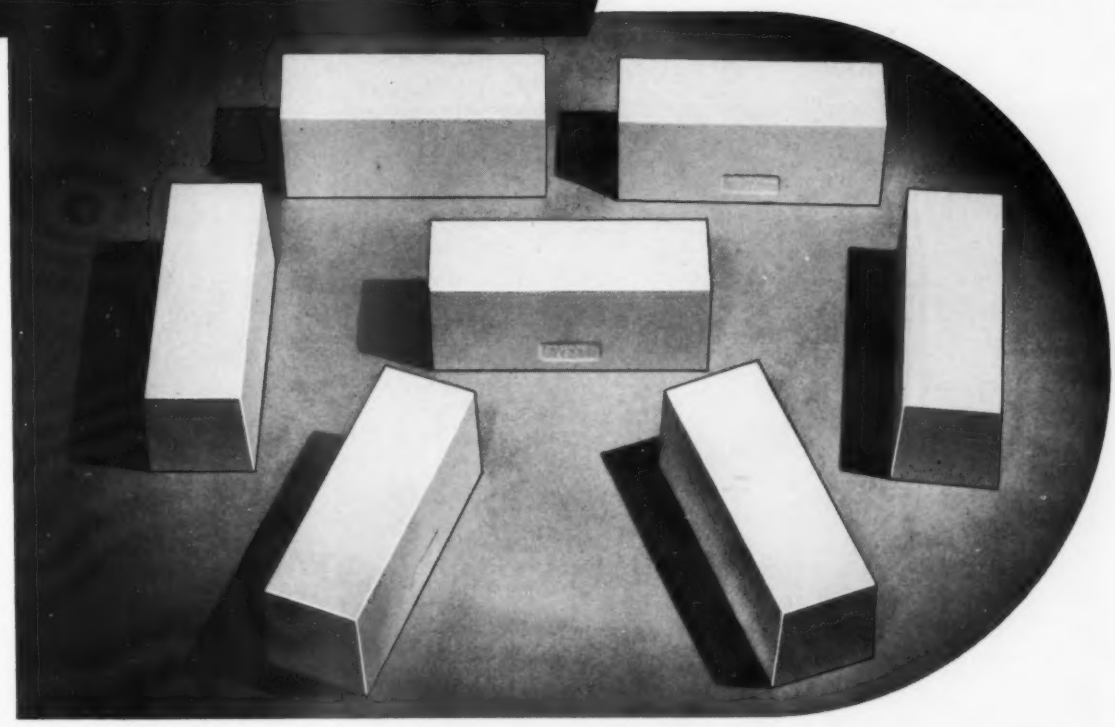
Donald M. Strathearn, recently appointed director of engineering for Bendix Home Appliances Division of Avco Mfg. Corp., has been given the additional assignment of directing Avco's laundry research and development program, it was announced by Parker H. Ericksen, Avco vice president and appliances general manager for Bendix and Crosley. →

***Frigidaire room air conditioners**— silver anniversary models — are shown rolling down the assembly line in Dayton, Ohio. Other types of air conditioning equipment are also made in this plant which has 377,946 sq. ft. of floor area. More than half of this space is devoted to room unit production, with over two miles of conveyors. Production capacity is being stepped up to double that of 1953 to meet the expected consumer demand.*



McDANEL

Super High Density Mill Linings



● Introduced two years ago McDanel Super High Density Mill Linings have withstood all tests—Sales increases indicate wide acceptance. Wherever installed they have shown a saving in cost of bricks—approximately 44% —and because of their longer wearing qualities—2½ times longer than other linings—a great saving in down time and relining expense.

The bricks are of uniform hardness and composition—are white, and have a smooth grinding surface.

Installation procedure is the same as for other types of ceramic linings.

Other McDANEL Products

Laboratory Grinding Jars and Jar Mills
Special Shapes . . . Mill Head Assemblies
Tank and Dryer Linings
Grinding Balls (Porcelain or High Density)

Let us send you full information

McDANEL *Industrial* PORCELAINS

McDANEL REFRACTORY PORCELAIN CO.
BEAVER FALLS, PENNA.

J. Paul Jones, former director of research and development and one-time director of Bendix engineering, resigned February 1.

At the same time, Ericksen revealed that Wallace P. Oliver, formerly vice president and director of engineering for Bendix, will play a more active consulting role, particularly in the development of new laundry products. Oliver had been a consultant to the firm since Bendix became a division of Avco.

MAGIC CHEF ADDS INCINERATOR TO LINE

A new gas incinerator that combines advanced operating features with streamlined design has been introduced by Magic Chef, Inc., St. Louis, as the most recent addition to the firm's growing line of home appliances.

The new unit is said to reduce trash and garbage of all types to a powdery ash, silently and automatically, without smoke or odor. Surrounding the burner is a radiant mesh cylinder that "triples the heat output" from the burner.

PHILLIPS HEADS WARM AIR HEATING, AIR COND. ASSN.

New officers of the National Warm Air Heating and Air Conditioning Association include:

President, C. B. Phillips, Surface Combustion Corp., Toledo; 1st vice pres., G. W. Denges, Williamson Heater Co., Cincinnati; 2nd vice pres., F. W. Meyer, Meyer Furnace Co., Peoria; managing director and secretary-treasurer, George Boeddener, Cleveland.

New members of the board of trustees are: S. J. Levine, General Electric Co., Bloomfield, N.J.; J. F. Deane, International Sales Co., San Francisco; E. A. Eichenberger, F. Meyer & Bro. Co., Peoria; and C. L. Sapp, Farquhar Furnace Co., Wilmington, Ohio.

The following were re-elected for another two-year term as members of the board: Sheldon Coleman, The Coleman Co., Inc., Wichita, Kan.; L. C. Harvey, Affiliated Gas Equipment, Inc., Cleveland; E. P. Hayes, C. A. Olsen Mfg. Co., Elyria, Ohio; and J. W. Norris, Lennox Furnace Co., Marshalltown, Iowa.

Members of the board whose terms have not expired include: T. I. Byrd, Lau Blower Co., Dayton; H. M. Carnahan, American Radiator & Standard Sanitary Corp., Pittsburgh; F. J.

Nunlist, Jr., L. J. Mueller Furnace Co., Milwaukee; and C. J. Pearson, U. S. Register Co., Battle Creek.

W. D. Redrup, Majestic Furnace Co., Huntington, Ind., and retiring president, replaces C. S. Franke, American Furnace Co., St. Louis, as ex-officio.

A. O. SMITH TO PRODUCE YEAR-ROUND AIR CONDITIONER

A year-round air conditioner has been developed by A. O. Smith Corp., and will be placed on the market in limited quantities in May. The packaged cooling unit will be housed in a modification of its present warm air furnace line, and will be manufactured at its Permaglas Division plant in Kankakee, Ill.

'53 SHIPMENTS OF OIL HEATING EQUIPMENT TOTAL 800,000 UNITS

Shipments of domestic automatic oil heating equipment in 1953 exceeded 800,000 burners and units, reports R. H. L. Becker, managing director of the Oil-Heat Institute. It was indicated that 1953 was the third biggest year in the industry's history.

EASTERN GAS WATER HEATER GROUP FORMED WITHIN GAMA

Eleven manufacturers' representatives attended the first meeting of an eastern manufacturers group recently formed within the Gas Appliance Manufacturers Association.

The group was formed of GAMA water heater manufacturers who are not members of the Pacific Coast Gas Association which has long had its own water heater organization.

Harry B. Carbon, of Bastian-Morley Co., Inc., was elected chairman, and Lee W. Rasch, of Rasch Manufacturing Corp., was named vice chairman.

Those attending the initial session were Carbon and H. J. Morley, of Bastian-Morley, Inc.; Charles Woodroof, of American Radiator and Standard Sanitary Corp.; Martin J. Boyle and J. N. Crawford, of Bryant Heater Division of Affiliated Gas Equipment, Inc.; Kress Ludlow, of Cleveland Heater Co.; Harold J.

Rust, of Handley Brown Heater Co.; L. R. Mendelson and Ralph R. Mendelson, of Hotstream Heater Co.; J. P. Hutchinson, of National Steel Construction Co. of Indiana; Bob Pemberson, of Ruud Manufacturing Co.; Max J. Eisner, of Sands Manufacturing Co.; R. Shepherd, of A. O. Smith Corporation; and D. W. Whitehead, of D. W. Whitehead Manufacturing Corporation.

ROYAL METAL PRES. DIES

Hobart A. Green, 56, president of Royal Metal Mfg. Co. since 1950, died January 29.

During Green's tenure as president, the metal furniture firm expanded production facilities as its main plant in Michigan City, Ind., purchased Conneaut Plating Industries, Conneaut, Ohio, and set up a new division, Royal-Walden Corp., in manufacturing facilities acquired at Walden, N.Y.

ING-RICH ENTERS PORCELAIN ENAMELED ALUMINUM FIELD

Ingram-Richardson Manufacturing Co., Beaver Falls, Pa., has announced completion of a program which has adapted some of its facilities to the production of porcelain enameled aluminum for architectural and other purposes. The company also will continue to manufacture enameled steel.

While some porcelain enameled aluminum has been produced on an experimental and small volume basis, Ing-Rich has now taken steps to handle large scale production. The firm has completed a modernization program which will enable it to produce up to 250,000 square feet monthly.

According to J. F. Ingram, president, the production of porcelain enameled aluminum requires far more critical control at each step in the manufacturing process than does porcelain enameled steel. To permit production of the new material, changes had to be made in some of the company's furnaces, frit grinding equipment, spraying mechanisms, pickling tanks, drying procedures, and laboratory equipment.

Ing-Rich now has three types of furnaces ready for the production of porcelain enameled aluminum — a continuous type, a box type, and a continuous-intermittent type. These furnaces and their auxiliary equipment can process panels up to 4½′ x 10′ in size.

A "CONVERSATION PIECE"

16 sheets of steel = 1 human hair

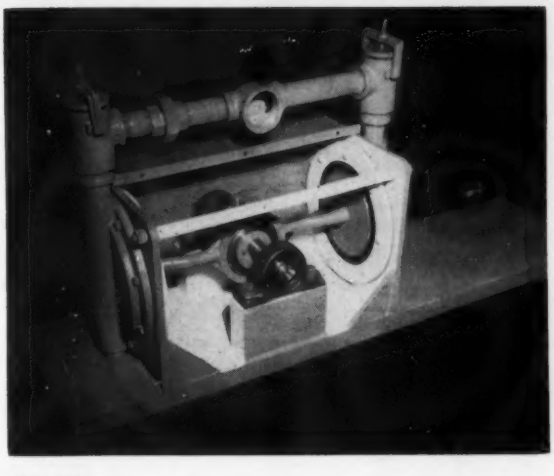
In an envelope received from Armco Steel Corp. recently was a piece of Armco 4-79Ni steel. It is one-eighth of a thousandth thick. Sixteen such sheets pressed together would approximate the thickness of a human hair.

Principal use of this new material, developed by Armco Research, is for small memory cores in high speed electronic computers. It costs $2,000,000 a ton, reports Armco. The name indicates that the steel contains 4% molybdenum and 79% nickel.

Now! 2 great VITRA-PUMPS for maintenance free operation

MODEL A 531 - 28 GPM

Because of its reputation for maintenance-free operation, the original 11 GPM Vitra-Pump has become a standard for the industry for use on dip tanks and in the millroom. As a result of the interest and desire on the part of some plants for a pump of larger capacity, Quinn-Rogers has now completed the engineering and is in production on a 28 GPM model. If there are applications in your plant which require the service of this larger capacity, we would be pleased to discuss the problem with you to determine how this new model will do the job.



SPECIFICATIONS

NAME: Quinn-Rogers VITRA-PUMP
MODEL NO.: A 531
CAPACITY: 28 Gallons per Minute
OVERALL PHYSICAL DIMENSIONS: 4' long x 1' 3" wide x 2' 7" high
DIAPHRAGM: 11 inch diameter (8" diameter exposed), pressure sealed self-priming, non-clogging
DIAPHRAGM MATERIALS: Natural rubber or synthetics depending upon the material to be pumped
STROKE: ½"
PRESSURE PLATES: ⅜" machined steel — 6½" diameter
FLYWHEEL: 15" diameter
SHAFT: 1¼" tempered steel
MOTOR*: 1 H.P. — 900 RPM
PUMP WEIGHT: 360 pounds
SHIPPING WEIGHT: Approximately 390 pounds
SHIPPING POINT: Forest Park, Illinois
Optional

MODEL A 53
11 GPM

STANDARD FOR THE INDUSTRY

WRITE FOR FREE BROCHURE

Sales Representatives

CHICAGO VITREOUS ENAMEL PRODUCT CO.
1401-47 S. 55th Court — Cicero, Ill.
East of the Rockies

MELVIN L. JONTZ COMPANY
5028 Alhambra Ave., Los Angeles, Calif.
West of the Rockies

QUINN-ROGERS MANUFACTURING CO.

345 BURKHARDT COURT, FOREST PARK, ILLINOIS

DEEPFREEZE UPS LEONE

A presstime report tells of the appointment of Pat Leone as manager of operations of the Deepfreeze Appliance Division of Motor Products Corp., North Chicago, Ill. In his new capacity, Leone will be responsible for all manufacturing, purchasing and industrial relations activities.

PRESSED METAL INSTITUTE ANNUAL TECHNICAL MEETING

A number of subjects of interest to the metal stamping industry will be discussed at the 5th annual Spring Technical Meeting of the Pressed Metal Institute, to be held at Hotel Carter, Cleveland, Ohio, March 17-19.

Registrants at the meeting will have an opportunity to visit one of three Cleveland plants during the meeting. These plants are Chevrolet's stamping division, Lincoln Electric, and Republic Steel's strip mill.

The first day will be devoted to "safety" and "power press" problems. It will include a film story on the Stanley Works safety program, with narration by Lowell Thomas; an address by the safety director of U.S. Steel; and a panel of experts from Budd, Heintz, and Philco discussing press safety.

The second day will be given over to a panel discussion on "in-process material handling" and "resistance welding."

Plant visitations will be held the morning of the third day, with a panel discussion on "plastic dies" scheduled for the afternoon session.

CASE INSTITUTE INDUSTRIAL FINISHES SHORT COURSE

The 3rd annual Short Course on Industrial Finishes will be held at the Case Institute of Technology, Cleveland, March 10-12.

This year's program covers the following subjects: (1) a critical review of the advantages and limitations of recent trends in coatings formulation, (2) recent engineering developments in paint application methods, (3) metal surface preparation with special reference to resin-bonded treatments, (4) special problems of aircraft finishes, (5) scientific measurements in the specification and control of gloss and color, (6) statistical methods in paint testing, and (7) laboratory methods of paint testing —other than accelerated weathering.

***Radioceramics symposium**—held at Rutgers University, January 13 — was devoted to the effect of radiations on ceramic materials, nuclear applications of them, and the use of radioisotopes in ceramic research. Speakers included: Front row — F. H. Norton, MIT; H. H. Blau, Ohio State U.; J. V. Fitzgerald (chairman), Rutgers; K. M. Laing, Pittsburgh Plate Glass; and R. C. Turnbull, Alfred U. Back row — J. R. Johnson, Oak Ridge Lab.; J. F. White, Atomic Energy Commission; J. R. Hensler, Bausch & Lomb; and J. C. Richmond, Bureau of Standards. The latter's talk was on "Radioisotope Studies of Porcelain Enamel Adherence." Attended by 200 persons, the symposium was co-sponsored by the Ceramic Association of New Jersey and the Rutgers School of Ceramics.*

Plastic tooling . . .

→ *from Page 52*

and to facilitate better relations between molder and user.

4. Upon completion of these tasks, report back to the Standards Committee that it recommends calling together a large, industry-wide committee on housings and appliances for study of specific product standardization work.

Members of the action group which is concerned with establishing standards includes:

E. F. Bushman, chairman; S. E. Ashley, General Electric Co., Louisville, Ky.; Eric Brown, Polyfiber, Ltd., Renfrew, Ontario; R. S. Buchanan, Westinghouse Electric Corp., Mansfield, O.; Robert Morrison, Molded Fiberglas Co., Ashtabula, O.; Sol Fingerhut, Zenith Plastics Co., Gardena, Calif., C. D. Jones, Structurlite Plastics Corp., Hebron, O.; L. S. Meyer, Newark, O.; B. W. Nelson, National Cash Register Co., Dayton.

Frank Reynolds, International Business Machines Corp., Endicott, N.Y.; H. R. Sheppard, Westinghouse Electric Corp., Pittsburgh, Pa.; A. L. Smith (chairman, SPI standards committee), Rohm & Haas Co., Bristol, Pa.; A. M. Varner, General Electric Co., Louisville, Ky.; Roger White, Glastic Corp., Cleveland, O.; Arthur Wiltshire, Apex Electrical Mfg. Co., Cleveland, O.; and Lawrence Wittman, Cordo Molding Products, Inc., New York, N.Y.

Phosphatizing . . .

→ *from Page 69*

chemistry and kinetics of phosphatizing, which not only enhanced theoretical knowledge, but was most fruitful for further practical advancement. For instance, the widespread use of phosphatizing at room temperature, known as "cold-phosphatizing" in Germany, was exclusively based on theoretical research of kinetic principles of phosphatizing. As early as 1942 this process was installed by the German Metallzesellschaft in hundreds of plants. Its advantages compared with phosphatizing at elevated temperatures are naturally self-explanatory.

NEWS ABOUT SUPPLIERS


T. H. JEFFERS


D. S. GAARDER


H. R. URBACH


ART DE PUY

JEFFERS TO NEW POST WITH ROBERTSHAW-FULTON

Robertshaw-Fulton Controls Co. has announced the appointment of Thomas H. Jeffers to the new position of assistant general manager of the Anaheim Division, Anaheim, Calif., and his election as an asst. vice president of the company. T. T. Arden continues as general manager of the division.

GAARDER TO HEAD INDUSTRIAL SALES FOR SHERWIN-WILLIAMS

Appointment of Donald S. Gaarder as general manager of industrial sales division of The Sherwin-Williams Co., was announced by A. H. Burt, vice president and director of sales.

Formerly manager of the division's new products department, Gaarder was promoted from the position of asst. general manager to succeed G. L. Hehl, veteran head of the division, who is now ill.

URBACH OBSERVES 50TH ANNIVERSARY WITH HOMMEL

During a presentation of service pins to employees of The O. Hommel Co., Pittsburgh, Ernest M. Hommel, president, paid special tribute to Herman R. Urbach who received his 50th year pin.

"His award is singular," stated Hommel, "but he has asked that no special occasion be made of it. No greater respect can be paid to any man than to comply with his wishes. Mr Urbach started to work with my father August 15, 1903. That he is still with us, hail and hearty, is proof in itself of what he has stood for and what he represents."

Regarding other anniversaries, Hommel stated, "10 people have completed their first anniversary . . . . 3 have a second anniversary (10 years) . . . . one his third (15 years) . . . . another his fourth (20 years); another his sixth (30 years)."

The recent presentation of service pins marked the 17th anniversary of a custom originated by Oscar Hommel, founder of the company.

DEPUY HEADS HONEYWELL'S NEW TRADE DIVISION

Art DePuy, formerly manager of the Detroit sales office, has been named head of the new trade division, of Minneapolis-Honeywell Regulator Co., to coordinate expanding activities within the firm's heating controls division, it was announced by K. L. Wilson, division manager. DePuy will headquarter in Minneapolis.

NEW PLANT MARKS THIRD FOR CINCINNATI CLEANING

Cincinnati Cleaning & Finishing Machinery Co., producers of industrial cleaning, washing, paint finishing and baking equipment, recently acquired a new plant in Sharonville, Ohio. It contains the firm's offices, engineering and estimating functions and manufacturing facilities.

Cincinnati Cleaning also operates two other plants in Ironton, Ohio, and now has a total of 60,000 sq. ft. of plant floor space. Facilities of the new plant will be concentrated on manufacture of specially-designed finishing equipment. Machines of standard design are fabricated at the Ironton plants.

JANECKE HEADS NEWLY-FORMED ALLIED PORCENELL, INC.

Ainslie Perrault, president of Allied Paint Mfg. Co., Tulsa, Okla., announced the formation of Allied Porcenell, Inc., Tulsa, with offices in Waukegan, Ill., and appointment of J. F. Janecke as president.

The new firm has been granted

600th automatic plating machine — *made by The Udylite Corporation. John V. Davis, chief engineer who designed the machine, and Clyde H. Reeme (right), president, look on as Lawrence V. Nagle, executive vice president, illustrates the purpose of the machine by using a plated Zippo cigarette lighter. This full automatic machine was built to copper-nickel-chrome plate steel and brass lighter cases for Zippo Mfg. Co., Bradford, Pa.*

Do you want to sell EQUIPMENT to the metal products field?

FOCUS your selling firepower. **finish** blankets the multi-billion dollar appliance and fabricated metal products manufacturing field. Here is an example of the equipment used in a single well known appliance plant: 20 gas and electric furnaces, 53 automatic trucks, 341 presses, 25 shears, 525 welding machines, 39 spray booths, 15 miles of conveyors, etc.

If you sell: presses or brakes — welding equipment — furnaces — ovens — conveyor equipment — pickling machines — ventilating systems — dust collectors — alloy burning tools — filters — water conditioning equipment — pumps — lighting equipment — mills — laboratory equipment — spray finishing equipment — materials handling equipment — controls — scales — tanks — shears — grinders — plating equipment — electrical hand tools, or some other type of equipment, to the appliance and metal products manufacturing field, then your sales story should be presented to this excellent market through **finish**. More and more leading suppliers are depending upon **finish** to do this important job for them.

The day of umbrella selling is over. Now is the time to focus your advertising and selling on the KEY MEN in the INDUSTRIES which buy and use your equipment.

BPA NBP

These equipment suppliers are reaching the appliance and metal products manufacturing field through **finish**.

The Cyril Bath Company
Binks Manufacturing Co.
Burdett Manufacturing Co.
Cincinnati Cleaning & Finishing Machinery Co.
Cleveland Process Company
Detrex Corporation
The DeVilbiss Company
The Fahralloy Company
Federal Machine & Welder Co.
Ferro Corporation
Fostoria Pressed Steel Corp.
The Impact Register Co.
Jensen Specialties, Inc.
Link-Belt Company
The R. C. Mahon Co.
Nu-Matic Grinders, Inc.
The Patterson Foundry & Machine Co.
Quinn-Rogers Mfg. Co.
Ransburg Electro-Coating Corp.
Richards-Wilcox Mfg. Co.
Robbins & Myers, Inc.
Rotospray Manufacturing Co.
Scientific Electric Co.
The Spra-Con Company
Struthers Wells Corp.
The Udylite Corporation
Union Steel Products Co.
Verson Allsteel Press Co.
Wean Equipment Corp.

THE MAGAZINE OF *Appliance* AND Metal Products MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

Dana Chase PUBLICATIONS

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exclusive license to sell, distribute, use and sub-license Porcenell as supplied under national and international patent rights of Vetreco, Inc., owned by Poor & Co. and The Youngstown Sheet and Tube Co.

Janecke has a 27-year background in the porcelain enamel industry with General Electric, Frigidaire, Toledo Porcelain, Bettinger, and more recently with Ferro Corp., Cleveland, as service and market development manager, and chairman of the PEI New Uses Committee.

FAIRMONT CHICAGO OFFICE

Fairmont Aluminum Co. has opened a new sales office in Chicago to service the mid-west area. L. M. Campbell, sales manager, named W. Bradley Blair as Chicago district manager.

TRIGG HEADS WESTINGHOUSE METALS DEVELOPMENT PLANT

W. M. Trigg has been named manager of Westinghouse Electric Corp.'s new metals development plant which will be built at Blairsville, Pa., it was announced by L. B. McCully, vice president in charge of the firm's East Pittsburgh divisions.

PROMAT EASTERN SALES REP.

The Promat Division of Poor & Company, Waukegan, Ill., has announced the appointment of Swift Industrial Chemical Co., Canton, Conn., as eastern sales representatives for the Promat line of metal finishing processes.

EHRETT TO HEAD SALES FOR GRAND RAPIDS VARNISH

Joseph A. Hager, vice president and director of sales, Grand Rapids Varnish Corp., has announced the appointment of Frank E. Ehrett as sales manager of the metal finishes division.

Ehrett had long been active in the industry in a similar capacity with another leading producer of industrial product finishes. Hager also announced the appointment of Vernor H. Moore as sales manager of the trade sales division. Both men will headquarter in Grand Rapids, Mich.

J. M. DAVIDSON

F. E. EHRETT

PENNSALT NAMES DAVIDSON TO METAL PROCESSING POST

John M. Davidson has been appointed asst. sales manager of the metal processing department, Pennsylvania Salt Mfg. Co., Philadelphia, it was announced by Joseph J. Duffy, Jr., department manager. Davidson will be responsible for all field activity and for the supervision of product-sales supervisors.

INDUSTRIAL FURNACE MFRS. ANNUAL MEETING

L. H. Gillette, manager, industrial heating sales, Westinghouse Electric Corp., was elected president and director of the Industrial Furnace Manufacturers Association at the annual meeting held in Philadelphia, January 25-26.

He succeeded Curt H. Vaughan, sales manager, Electric Furnace Co., Salem, Ohio, who was elected as a member of the executive committee.

Carl L. Ipsen was re-elected executive vice president. Ralph E. Whittaker, secretary, Swindell-Dressler Corp., Pittsburgh, was re-elected treasurer.

New directors are Horace Drever, president, Drever Co., Philadelphia, and Norman H. Davies, president, North American Manufacturing Co., Cleveland. Directors whose term continues are: L. A. Shea, general sales manager, Lindberg Engineering Co., Chicago; A. L. Hollinger, manager, steel mill division, Surface Combustion Corp., Toledo; J. J. Walker, vice president and general manager, C. I. Hayes, Inc., Providence; William Adam, Jr., executive vice president, Ajax Electric Co., Inc., Philadelphia; Ralph E. Whittaker; and C. H. Vaughan.

Work is under way on a "dictionary" of furnace and heating terms and definitions to be published by the association. R. L. Harper, executive vice president, Harper Electric Furnace Corp., Buffalo, is chairman of a committee in charge of the project.